Data on Particles and Resonant States*

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Data and references on properties of particles and resonances are compiled, tested for consistency, and summarized in tables and wallet cards. This is an updating of the *Reviews of Modern Physics* article of October 1964, and some new quantities have been included in the tables.

This data survey is an updating of that of one year ago.[1] To save space we discuss only the changes since then, and omit the descriptions of the tables and compiling procedures. However, we do want to re-emphasize the warning carried by the entries "$\times$ Scale $=\cdots$." As an example, consider the $A2$ meson, whose mass is listed as $1324\pm9\times$ Scale $=2.5$ MeV. This means that the masses used in arriving at the weighted average of 1324 ± 9 MeV are inconsistent, and have a chi-squared larger than expected by a factor of 2.5^2. In UCRL 8030[2] we present ideograms of all the sets of input data which have abnormally large chi squareds, and the ideogram for the $A2$ mass is double-humped, showing that the 9-MeV calculated error of the average is absurdly unrealistic. The reader can look at the ideogram and decide for himself which experiments to bet on. If he chooses not to do this, he should *at least* take the point of view that all the input errors are equally underestimated (by a factor of 2.5), and take the calculated error to be 9 MeV $\times 2.5$, i.e., about 22 MeV.

Wallet cards in two sizes are available from Lawrence Radiation Laboratory, University of California, Berkeley, California.

CHANGES IN TABLE S (STABLE PARTICLES)

We have added magnetic moments to Table S, and decay parameters of hyperons to Table S-Decay.

A new measurement by Shafer, Crowe, and Jenkins (SHAFER 65) has reduced the error on the charged pion mass from 50 to 15 keV. This result affects the mass of all the other mesons and hyperons to a small extent. For an up-to-date review, see the article by Barkas.[3]

CHANGES IN THE MESON TABLE

In the meson table we have listed several states for which it has not been shown that they have well-defined quantum numbers (D, E, $A1$, B, κ, C). Alternative explanations have been put forward for the $A1$,[4–7] the B,[8] and the κ.[9]

Because of their current interest, we have added information on possible C-violating decay modes.

CHANGES IN THE BARYON TABLE

New useful quantities have been added in this table. In the second column of the table we give both kinetic energy and momentum of the π or K beam (incident on a proton), out of which these resonances can be directly formed. In addition to the mass squared of the resonance, we give now also $\Gamma(M^2)$. On a mass-squared scale, this quantity is equivalent to the full width of the resonance; i.e., $\Gamma(M^2)=2M\Gamma(M)$.

SU(3) ASSIGNMENTS

A large fraction of the particles with known spin and parity has been successfully grouped into SU(3) multiplets.

Among the *baryons* the N, Λ, Σ, and Ξ are assigned to a $J^P=\frac{1}{2}^+$ octet, satisfying the Gell-Mann–Okubo mass formula[10]:

$$\tfrac{1}{2}(M_N+M_\Xi)=\tfrac{1}{4}(3M_\Lambda+M_\Sigma). \qquad (1)$$

The $N_{\frac{3}{2}}^*(1238)$, $Y_1^*(1385)$, $\Xi^*(1530)$, and Ω^- are assigned to a $\frac{3}{2}^+$ decuplet satisfying the equal mass spacing rule.

Among the *mesons* nine 0^- states (π, K, η, X^0), and

* This work is done under the auspices of the U.S. Atomic Energy Commission.

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TABLES FROM UCRL-8030(rev.)

Table S – Stable particles

		$I(J^{PG})C$	Mass (MeV)	Mass difference (MeV)	Mean life (sec)	$Mass^2$ $(BeV)^2$	Magnetic moment $(e/2m_p)$	Important decays: Partial mode	Fraction	Q (MeV)	p or p_{max} (MeV/c)
LEPTONS	γ	$J^P=1^-C^-$			stable	0		stable			
	ν_e ν_μ	J=1/2	0(<0.2 keV) 0(<2.5 MeV)		stable	0 0		stable			
	$e^\mp$	J=1/2	0.511006 ±0.000002		stable	0.000	1.0011609 † ±.0000024	stable			
	$\mu^\mp$	J=1/2	105.659 ±0.002	$\mu-\pi^\pm$: -33.95 ±0.05	2.2001×10^{-6} ±.0008 ×scale=2.5	0.011	[1.001162 ±.000005 in $e/2m_\mu$]	$e\nu\bar{\nu}$	100%	105.15	52.8
MESONS	$\pi^\pm$	$1(0^{--})C_n^+$	139.580 ±0.015	$\pi^\pm-\pi^0$: 4.6056 ±0.0055	2.551×10^{-8} ±.026	0.019		$\mu\nu$ $e\nu$ $\mu\nu\gamma$ $\pi^0e\nu$	100% $(1.24\pm.03)10^{-4}$ $(1.24\pm.25)10^{-4}$ $(1.11\pm.08)10^{-8}$	33.92 139.07 33.92 4.09	29.80 69.80 29.80 4.50
	π^0		134.974 ±0.015		1.78×10^{-16} ±.26 ×scale=1.3	0.018		$\gamma\gamma$ γe^+e^-	98.8 (1.19±.05)%	135.00 133.95	67.50 67.49
	$K^\pm$	$1/2(0^-)$	493.78 ±0.17	-3.90 ±0.25	1.229×10^{-8} ±.008	0.244		$\mu\nu$ $\pi^\pm\pi^0$ $\pi^\pm\pi^-\pi^+$ For other decays see Table S–Decay	(63.2±.4)% (21.3±.4)% (5.5±.1)% ×scale = 1.4	388.1 219.2 75.0	235.6 205.2 125.5
	K^0		497.7 ±0.30		50%K1, 50%K2						
	K_1			$-0.91\times1/\tau_1$ ±0.07 ×scale=2.3	0.881×10^{-10} ±.010 ×scale=1.4	0.248		$\pi^+\pi^-$ $\pi^0\pi^0$	(68.5±1.0)% (31.5±1.0)%	218.5 227.8	206.0 209.1
	K_2				5.77×10^{-8} ±.59	0.248		$\pi^0\pi^0\pi^0$ $\pi^+\pi^-\pi^0$ $\pi\mu\nu$ $\pi e\nu$ $\pi^+\pi^-$	(24.8±3.0)% (13.6±1.0)% (26.2±2.6)% (35.4±2.7)% $(2.1\pm0.3)\times10^{-3}$	92.8 83.6 252.5 357.6 218.5	139.3 132.8 216.0 229.3 206.0
	η	$0(0^{-+})C^+$	548.8 ±0.5		Γ < 10 MeV	0.301		$\gamma\gamma$ $3\pi^0$ or $\pi^0 2\gamma$ $\pi^+\pi^-\pi^0$ $\pi^+\pi^-\gamma$ $\pi^0e^+e^-$	(38.6±2.7)% (30.8±2.3)% (25.0±1.6)% (5.5±1.2)% <(1.1±1.1)% ×scale=1.4	548.7 143.8 134.8 269.5 412.7	274.3 179.5 174.4 236.2 257.7
BARYONS	p	$1/2(1/2^+)$	938.256 ±0.005	-1.2933 ±0.0001	stable	0.880	2.792816 ±.000034				
	n		939.550 ±0.005		1.01×10^3 ±.03	0.882	-1.913148 ±.000066	$pe^-\nu$	100%	0.78	1.19
	Λ	$0(1/2^+)$	1115.44 ±0.12 ×scale=1.2		2.61×10^{-10} ±.02 ×scale=1.5	1.242	-0.73 ±0.17	$p\pi^-$ $n\pi^0$ For other decays see Table S–Decay	(66.3±1.0)% (33.6±1.0)% ×scale=1.3	37.6 40.9	100.2 103.7
	Σ^+	$1(1/2^+)$	1189.39 ±0.14	$\Sigma^0-\Sigma^+$: 7.90 ±0.09	0.794×10^{-10} ±.026	1.415	4.3±1.5	$p\pi^0$ $n\pi^+$ For other decays see Table S–Decay	51.0±2.4% 49.0±2.4%	116.2 110.3	189.0 185.0
	Σ^0		1192.3 ±0.2	$\Sigma^--\Sigma^0$: 4.86 ±0.07	<1.0×10^{-14}	1.422		$\Lambda\gamma$ See Table S–Decay	100%	77.0	74.5
	Σ^-		1197.20 ±0.14		1.58×10^{-10} ±.05	1.433		$n\pi^-$ For other decays see Table S–Decay	100%	118.1	192.8
	Ξ^0	$1/2(1/2^+)$?	1314.3 ±1.0	6.5 ±1.0	3.05×10^{-10} ±.38 × scale = 1.3	1.727		$\Lambda\pi^0$ For other decays see Table S–Decay	100%	63.9	134.8
	Ξ^-		1320.8 ±0.2 × scale = 1.2		1.75×10^{-10} ±.05 × scale = 1.1	1.745		$\Lambda\pi^-$ $\Lambda e^-\nu$ $n\pi^-$	100% $\leq1.7\times10^{-3}$ $<5\times10^{-3}$	65.8 204.9 241.7	138.7 189.4 303.0
	Ω^-	$0(3/2^+)$? ?	1675 ± 3		1.3×10^{-10} ±.7	2.806		$\Xi\pi$ $\Lambda\bar{K}$	? ?	221 66	296 216

† In units of $(e/2m_e)$.

A. H. Rosenfeld, A. Barbaro-Galtieri, W. H. Barkas, P. L. Bastien, J. Kirz, and M. Roos, UCRL-8030 - Part I, August, 1965.

Table S—Decay

An Appendix to Table S for decay parameters and branching fractions

	Partial mode	Fraction	Q (MeV)	p or p_{max} (MeV/c)	$\alpha^{\dagger}$	$\beta^{\dagger}$	$\gamma^{\dagger}$	$\Delta^{\dagger}$
$K^{\pm}$	$\mu^{\pm}\nu$	$(63.2 \pm .4)\%$ ×scale=1.4	388.1	235.6				
	$\pi^{\pm}\pi^{0}$	$(21.3 \pm .4)\%$	219.2	205.2				
	$\pi^{\pm}\pi^{+}\pi^{-}$	$(5.52 \pm .08)\%$	75.0	125.5				
	$\pi^{\pm}\pi^{0}\pi^{0}$	$(1.68 \pm .05)\%$	84.3	133.0				
	$\pi^{0}\mu^{\pm}\nu$	$(3.4 \pm .2)\%$	253.1	215.2				
	$\pi^{0}e^{\pm}\nu$	$(4.9 \pm .2)\%$	358.3	228.4				
	$\pi^{\pm}\pi^{\mp}e^{\pm}\nu$	$(4.3 \pm .9)10^{-5}$	214.1	203.5				
	$\pi^{\pm}\pi^{\pm}e^{\mp}\nu$	$<0.1 \times 10^{-5}$	214.1	203.5				
	$\pi^{\pm}\pi^{0}\gamma$	$(2.2 \pm 0.7)10^{-4}$	219.2	205.2				
	$\pi^{\pm}\pi^{\mp}\mu^{\pm}\nu$	$\leq 1.2 \times 10^{-5}$	109.0	151.1				
	$\pi^{\pm}e^{+}e^{-}$	$<1.1 \times 10^{-6}$	353.2	227.2				
	$\pi^{\pm}\mu^{+}\mu^{-}$	$<3 \times 10^{-6}$	142.9	171.9				
	$e^{\pm}\nu$	$<1.6 \times 10^{-3}$	493.3	246.9				
	$\pi^{\pm}\pi^{+}\pi^{-}\gamma$	$(9 \pm 4)10^{-5}$	75.0	125.5				
Λ	$p\pi^{-}$	$(66.3 \pm 1.0)\%$ ×scale	37.6	100.2	$+0.659 \pm 0.047$			$(15 \pm 20)°$
	$n\pi^{0}$	$(33.6 \pm 1.0)\%$ =1.2	40.9	103.7				
	$p\mu\nu$	$(1.5 \pm 1.2)10^{-4}$	71.5	130.8				
	$pe\nu$	$(0.88 \pm .08)10^{-3}$	176.7	163.1				
		×scale = 1.3						
Σ^{+}	$p\pi^{0}$	$(51.0 \pm 2.4)\%$	116.2	189.0	$-0.79 \pm .09$			
	$n\pi^{+}$	$(49.0 \pm 2.4)\%$	110.3	185.1	-0.05 ± 0.08			
	$n\pi^{+}\gamma$	$\approx 0.2 \times 10^{-4}$	110.3	185.1				
	$\Lambda e^{+}\nu$	$\approx 0.2 \times 10^{-4}$	73.4	71.6				
	$p\gamma$	$(3.7 \pm 0.8)10^{-4}$	251.1	224.6				
	$n\mu^{+}\nu$	$<1.1 \times 10^{-4}$	144.2	202.4				
	$ne^{+}\nu$	$<0.5 \times 10^{-4}$	249.3	223.6				
Σ^{0}	$\Lambda\gamma$	100%	77.0	74.5				
Σ^{-}	$n\pi^{-}$	100%	118.1	192.8	$-0.16 \pm .21$			
	$n\pi^{-}\gamma$	$\approx 0.1 \times 10^{-4}$	118.1	192.8				
	$n\mu^{-}\nu$	$(0.66 \pm .15)10^{-3}$	152.0	209.4				
	$ne^{-}\nu$	$(1.2 \pm 0.2)10^{-3}$	257.1	229.9				
	$\Lambda e^{-}\nu$	$(0.75 \pm .28)10^{-4}$	81.2	79.0				
Ξ^{0}	$\Lambda\pi^{0}$	$\approx 100\%$	63.9	134.8	$-0.34 \pm .12$	0.05	0.94	$(8 \pm 62)°$
	$p\pi^{-}$	$<2.7\%$	236.5	298.7				
	$pe^{-}\nu$	$<2.7\%$	375.5	322.2				
	$\Sigma^{+}e^{-}\nu$	$<1.3\%$	124.4	119.0				
	$\Sigma^{-}e^{+}\nu$		116.6	111.9				
Ξ^{-}	$\Lambda\pi^{-}$	100%	65.8	138.7	$-0.410 \pm .046$	$+0.12$	0.90	$(-17 \pm 18)°$
	$\Lambda e^{-}\nu$	$\leq 1.7 \times 10^{-3}$	204.9	189.4				
	$n\pi^{-}$	$<5 \times 10^{-3}$	241.7	303.0				

† The definition of these quantities is taken as follows:

$$\alpha = \frac{2\,\mathrm{Re}(S^{*}P)}{|S|^{2}+|P|^{2}}; \qquad \beta = \frac{2\,\mathrm{Im}(S^{*}P)}{|S|^{2}+|P|^{2}}; \qquad \gamma = \frac{|S|^{2}-|P|^{2}}{|S|^{2}+|P|^{2}}; \qquad \tan\Delta = \frac{\beta}{\alpha}.$$

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Mesons

Group	Particle	Mass (MeV)	$I(J^{PG})CA$ ⊢⊣=estab.	Symbol	Γ (MeV)	$(Mass)^2 \pm \Gamma(M^2)$ $(BeV)^2$	Partial modes	Fraction (%)	Q (MeV)	p_p or p_{max} (MeV/c)
η	η	548.9 ±0.5	$0(0^{-+})C^+A^-$ ⊢⊣	η_β	<10	0.301 < 0.01	See Table S			
η	ω	782.8 ±0.5 Xscale=1.9	$0(1^{--})C^-A^-$ ⊢⊣	η_γ	12.0 ±1.7 Xscale=1.2	0.613 0.019	$\pi^+\pi^-\pi^0$ $\pi^+\pi^-$ neutral($\pi^0\gamma$) η+neutral $\pi^+\pi^-\gamma$ e^+e^- $\mu^+\mu^-$	88 seen † 10.6±1 <1.7 <5 ≈0.01 <0.10	369 504 648 234 504 782 572	327 366 380 199 366 391 377
η	X^0 or η'	958.6 ±1.6	$0(0^{-+})C^+A^-$ ⊢⊣	η_β	<4	0.920 <0.008	$\eta 2\pi$ $\pi^+\pi^-\gamma$	76±4 24±4 Xscale=1.2	131 680	232 459
η	K_1K_1	≈1000	May be just large $\bar{K}K$ scattering length, see listings of data cards.							
η	φ	1019.5 ±0.3 Xscale=1.7	$0(1^{--})C^-A^+$ ⊢⊣	η_γ	3.3 ±0.6	1.039 0.007	K_1K_2 K^+K^- πρ +3π $\pi^0\gamma$ η+neutral $\mu^+\mu^-$ e^+e^-	38±3 30±3 32±8 Xscale=1.4 <12 <0.5 <0.4	23 32 117 885 471 808 1018	109 126 188 501 362 499 510
η	f	1253 ± 20	$0(2^{++})C^+A^+$ ⊢⊣	η_α^{II}	118 ±16	1.571 0.294	ππ 4π $\bar{K}K$	large <4 <4	974 695 265	611 547 386
η	D	1286 ±6	$0(1^{++})C^+A^-$	η	40 ±10	1.65 0.105	$K\bar{K}\pi$		154	303
η	E (a)	1420 ±10	$0(\ \ )CA^-$? ?	η	60 ± 10	2.02 0.17	$K^*\bar{K}$ $K\bar{K}\pi$	large	35 293	151 430
η	f'	1500	$0(2^{++})C^+A$ ⊢⊣	η_α^{II}	80	2.25 0.24	K_1K_1 $K\bar{K}^*(890)$		505 111	561 274
π	$\pi^\pm$ π^0	139.6 135.0	$1(0^{--})C_n^+A^-$ ⊢⊣	π_β		0.019 0.018	See Table S			
π	ρ	765 ±3 Xscale=1.3	$1(1^{-+})C_n^-A^+$ ⊢⊣	π_γ	124 ±4 Xscale=2.8	0.585 0.173	2π 4π πγ e^+e^-	100 <5 <2 ≈0.0065	486 207 626 764	357 243 370 382
π	A1	1072 ± 8 (b) Xscale=1.6	$1(1^{+-})C_n^+A^-$ ⊢⊣ ⊢⊣	π	125	1.150 0.27	ρπ $\bar{K}K$	≈100 <5	167 C forbidden for odd J	231
π	B (b)	1220	$1(\geq 1^{?+})C_n^-A^+$ ⊢⊣ ⊢⊣	π	125 ±17 Xscale=2.2	1.488 0.31	ωπ ππ $\bar{K}K$ 4π	≈100 <30 <10 <50	298 Permitted only for 1^- assignment, if J<3 662	339 528
π	A2	1324 ±9 Xscale=2.5	$1(2^{+-})C_n^+$ ⊢⊣	π_α^{II}	90 ±10	1.753 0.24	ρπ $\bar{K}K$ ηπ	≈91 5.5±1.5 3.6±3.0 Xscale=1.3	419 333 636	426 439 537
K	$K^\pm$ K^0	493.8 497.8	$1/2(0^-)A^-$ ⊢⊣	K_β		0.244 0.248	See Table S			
K	κ (b)	725 ±2	$1/2(0^+)A^+$ ⊢⊣	K	<12	0.526 <0.017	Kπ	≈100	92	154
K	K^*	891.4 ±0.8	$1/2(1^-)A^+$ ⊢⊣	K_γ	49 ± 2 Xscale=1.1	0.794 0.087	Kπ Kππ κπ	≈100 <0.2 <0.2	258 118 27	288 215 82
K	C (a)	1215 ±15	$\leq 3/2(\ \ )A^-$ ⊢⊣ ? ?	K	60 ±10	1.476 0.145	Kρ $K^*\pi$	? ?	-44 184	<0 253
K	K^*	1405 ±8	$1/2(2^+)A^+$	K	95 ±11	1.988 0.27	Kπ	?	775	610

† Reported values range between <0.5 and 11%, and depend on assumptions on ρ − ω interference.
(a) It has not been shown that this entry corresponds to a state with well defined quantum numbers.
(b) It has not been shown that this entry corresponds to a state with well defined quantum numbers. See text for references suggesting alternate mechanism.

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Baryons

Group	Particle	Beam π and K (MeV) and (MeV/c)	$I(J^P)$ ⊢⊣=estab.	Symbol	Mass (MeV)	Γ (MeV)	$Mass^2$ and $\Gamma(M^2)$ $(BeV)^2$	Partial mode	Fraction (%)	Q (MeV)	p or pmax (MeV/c)
N	p n	See Table S	$1/2(1/2^+)$ ⊢⊣	N_α	938.2 939.6		0.88 0.88	See Table S			
N	$N^*_{1/2}(1480)$	550 MeV 675 MeV/c	$1/2(1/2^+)$	Existence not yet definitely established							
N	$N^*_{1/2}(1518)$	610 MeV 737 MeV/c	$1/2(3/2^-)$ ⊢⊣	N_γ	1518 ±10	120	2.30 0.37	πN Nππ	75	440 301	454 408
N	$N^*_{1/2}(1688)$	900 MeV 1030 MeV/c	$1/2(5/2^+)$ ⊢⊣	N_α^{II}	1688	100	2.85 0.34	πN Nππ ηN ΛK	≈85 < 2	610 471 201 75	572 538 389 231
N	$N^*_{1/2}(2190)$	1935 MeV 2070 MeV/c	$1/2(7/2^-)$ ⊢⊣ ? ?	N_γ^{II}(?)	2190	≈ 200	4.80 0.88	πN ΛK	≈ 40 seen	1112 577	888 710
N	$N^*_{1/2}(2650)$	3113 MeV 3250 MeV/c	$1/2(9/2^+)$ ⊢⊣ ? ?	N_α^{III}	2645 ±10	≈200	7.00 1.06	πN ηN		1567 1158	1151 1090
Δ	$N^*_{3/2}(1236)$	196 MeV 305 MeV/c	$3/2(3/2^+)$ ⊢⊣	Δ_δ	1236.0 ±0.4	120.0 ±1.5	1.53 0.30	πN	100	160	233
Δ	$N^*_{3/2}(1924)$	1354 MeV 1488 MeV/c	$3/2(7/2^+)$ ⊢⊣	Δ_δ^{II}	1924	≈200	3.70 0.65	πN ΣK	60	846 241	725 435
Δ	$N^*_{3/2}(2360)$	2349 MeV 2485 MeV/c	$3/2(9/2^-)$ ⊢⊣ ? ?	Δ_β^{III}(?)	2360	~ 200	5.58 0.95	πN	≈ 15	1282	988
Δ	$N^*_{3/2}(2825)$	3633 MeV 3770 MeV/c	$3/2(11/2^+)$ ⊢⊣ ? ?	Δ_δ^{III}	2825	260	7.98 1.47	πN		1747	1252
Λ	Λ	See Table S	$0(1/2^+)$ ⊢⊣	Λ_α	1115.4		1.24	See Table S			
Λ	$Y^*_0(1405)$	< 0 Kp	$0(1/2^-)$ ⊢⊣	Λ_β	1405	35±5	1.97 0.10	Σπ Λππ	100 < 1	76 10	151 69
Λ	$Y^*_0(1520)$	137 MeV 393 MeV/c	$0(3/2^-)$ ⊢⊣	Λ_γ	1518.9 ±1.5	16 ±2	2.31 0.05	Σπ $\bar{K}N$ Λππ	55±7 29±4 16±2	190 87 124	266 243 251
Λ	$Y^*_0(1815)$	662 MeV 1045 MeV/c	$0(5/2^+)$ ⊢⊣	Λ_α^{II}	1815 ±5	50	3.29 0.18 [mainly $Y^*_1(1385)+\pi$] ←	$\bar{K}N$ Σπ Λππ Λη	≈ 75 ≈ 9 ≈ 15 ≈ 1	378 486 420 151	538 504 515 344
Σ	Σ	See Table S	$1(1/2^+)$ ⊢⊣	Σ_α	(+) 1189.5 (0) 1192.6 (-) 1197.4		1.41 1.42 1.43	See Table S			
Σ	$Y^*_1(1385)$	< 0 Kp	$1(3/2^+)$ ⊢⊣	Σ_δ	1382.7 ±.5 Xscale=1.5	44 ±2 Xscale=2.8	1.91 0.12	Λπ Σπ	90±2 10±2 Xscale=1.4	127 55	205 124
Σ	$Y^*_1(1660)$	374 MeV 715 MeV/c	$1(\geq 3/2)$ ⊢⊣	Σβ	1660 ±10	44 ±5	2.76 0.15 [mainly $Y^*_0(1405)+\pi$] ←	$\bar{K}N$ Σπ Λπ Σππ Λππ	≈ 15 ≈ 30 ≈ 5 ≈ 30 ≈ 20	223 328 405 188 265	400 383 439 321 389
Σ	$Y^*_1(1765)$	561 MeV 932 MeV/c	$1(5/2^-)$ ⊢⊣	Σ_β	1762 ±17	75 ±7 Xscale=2.1	3.11 0.26	$\bar{K}N$ Λπ Σπ $Y^*_1(1385)+\pi$ $Y^*_0(1520)+\pi$	≈ 60 ≈ 16 ≲ 3 ≈ 10 ≈ 10	328 510 436 243 107	496 517 467 318 188
Σ	$Y^*_1(2065)$	1180 MeV 1600 MeV/c	$1(7/2^+)$ ⊢⊣	Σ_δ^{II}	2065	≈ 160	4.26 0.74	$\bar{K}N$ Λπ	~.35	632 819	728 726
Ξ	Ξ	See Table S	$1/2(1/2^+)$ ⊢⊣	Ξ_α	(-) 1321 (0) 1314		1.75 1.73	See Table S			
Ξ	$\Xi^*(1530)$		$1/2(3/2^+)$ ⊢⊣ p wave	Ξ_δ	(-) 1529.7 ±0.9 Xscale = 1.1	7.5 ±1.7	2.34 0.02	Ξπ	≈ 100	73	148
Ξ	$\Xi^*(1816)$		$1/2(3/2^-)$ ⊢⊣	Ξ_γ	1816 ±3	16 ± 4 Xscale=2.2	3.29 0.06	$\Xi^*\pi$ $\Lambda\bar{K}$ Ξπ Ξππ	≈ 25 ≈ 65 ≈ 5 ≈ 5	149 205 362 222	232 394 413 312
Ξ	$\Xi^*(1933)$		$1/2(5/2^+)$	Ξ	1933 ±16	140 ±35	3.74 0.54	Ξπ		473	501
Ω	Ω^-	See Table S	$0(3/2^+)$	Ω_δ	1675 ±3		2.81	See Table S			

A. H. Rosenfeld, A. Barbaro-Galtieri, W. H. Barkas, P. L. Bastien, J. Kirz, and M. Roos, UCRL-8030 - Part I, August 1965.

nine 1^- states (ρ, $K^*(890)$, ω, ϕ) are known, and the grouping of ($A2$, $K^*(1440)$, f^0, f') into a 2^+ nonet has been suggested.[11] These nonets may be considered as (octet+singlet) representations of SU(3), with possible mixing between the isosinglet member of the octet and the SU(3) singlet to form the observed particles. The Gell-Mann–Okubo formula

$$M^2_{I=0}=\tfrac{1}{3}[4M^2_{I=\frac{1}{2}}-M^2_{I=1}] \qquad (2)$$

predicts the mass of the $I=0$ member of the octets. Note that in all three cases the calculated mass falls between the masses of the two observed $I=0$ states in the nonet as is required. For 0^- mesons the predicted value (568 MeV) is close to the η mass, and does not require significant mixing between the η and the X^0. In the other two cases (928 MeV for 1^-, 1435 MeV for 2^+) the mixing is considerably stronger.

[11] L. M. Hardy *et al.*, Phys. Rev. Letters **14,** 401 (1965); R. C. Arnold, Phys. Rev. Letters **14,** 657 (1965); S. L. Glashow and R. H. Socolow, Phys. Rev. Letters **15,** 329 (1965); also, S. U. Chung *et al.*, Phys. Rev. Letters **15,** 325 (1965); and V. E. Barnes *et al.*, Phys. Rev. Letters **15,** 322 (1965).

[f] Recent revisions and comments may be found in the review papers by A. H. Rosenfeld and by Ch. Peyrou in the *Proceedings of the 1965 Oxford Conference on High Energy Physics* (to be published January 1966).

DATA FOR TABLES ON STABLE PARTICLES

STABLE MEANING IMMUNE TO STRONG DECAY

```
*     END TAPE

CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
     IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
```

ν_e

```
                      1  E-NEUTRINO  (0,J=1/2)

                      1  E-NEUTRINO  MASS (KEV)

S 1M *    LESS THAN              0.25    LANGER      52 CNTR
S 1M *    LESS THAN              0.15    HAMILTON    53 CNTR
S 1M *    LESS THAN     0.55 +OR- 0.28   FRIEDMAN    58 CNTR
```

ν_μ

```
                      2  MU-NEUTRINO  (0,J=1/2)

                      2  MU-NEUTRINO  MASS (MEV)
S 2M *    LESS THAN              3.5     BARKAS      56 EMUL
S 2M *    LESS THAN              4.0     DUDZIAK     59 CNTR
S 2M *    LESS THAN              2.5     BARDON      65 SPRK
S 2M *    LESS THAN              2.8     SHAFER      65 CNTR
```

e

```
                      3  ELECTRON  (0.5,J=1/2)

                      3  ELECTRON  MASS (MEV)

S 3M        0.511006  0.000002           COHEN       63 RVUE

                      3  ELECTRON MAGNETIC MOMENT(E/2ME)

S 3MM      1.0011609 0.0000024           SCHUPP      61 CNTR
```

μ

```
                      4  MUON  (106,J=1/2)

                      4  MUON  MASS (MEV)

S 4M       105.659    0.002              FEINBERG    63 RVUE

                      4  MUON LIFETIME (UNITS 10**-6)

S 4T         2.200    0.015    0.015     FISHER      59 CNTR
S 4T         2.211    0.003    0.003     REITER      60 CNTR
S 4T         2.225    0.006    0.006     ASTBURY     60 CNTR
S 4T         2.208    0.004    0.004     TELEGDI     60 CNTR
S 4T         2.203    0.004    0.004     LUNDY       62 CNTR

S 4T         2.198    0.001    0.001     FARLEY      62 CNTR
S 4T         2.202    0.003    0.003     ECKHAUSE    62 CNTR
S 4T         2.197    0.002    0.002     MEYER       63 CNTR

                      4  MUON PARTIAL DECAY MODES

S 4P1     MUON INTO E (E-NEU) (MU-NEU)                        S 3S 1S 2
S 4P2     MUON INTO E 2GAMMA                                  S 3S 0S 0
S 4P3     MUON INTO 3ELECTRONS                                S 3S 3S 3
S 4P4     MUON INTO E GAMMA                                   S 3S 0

                      4  MUON  BRANCHING RATIOS

S 4R1*    MUON INTO  E+2GAMMA  (IN UNITS OF 10**-5)          (P2)/(P1)
S 4R1*    LESS THAN              1.6     FRANKEL 1   63 SPRK

S 4R2*    MUON INTO 3E (IN UNITS OF 10**-7)                   (P3)/(P1)
S 4R2*    LESS THAN              5.0     PARKER 1    62 CNTR
S 4R2*    LESS THAN              1.3     ALIKHANOV   62 SPRK
S 4R2*    LESS THAN              1.5     FRANKEL 2   63 CNTR
S 4R2*    LESS THAN              1.45    BABAEV      63 SPRK

S 4R3*    MUON INTO  E+GAMMA  (IN UNITS OF 10**-8)           (P4)/(P1)
S 4R3*    LESS THAN              1.2     FRANKEL 1   63 SPRK
S 4R3*    LESS THAN              0.6     PARKER 2    64 SPRK

                      4  MUON  MAGNETIC MOMENT (IN E/(2*MUON MASS)

S 4MM       1.001162  0.000005           CHARPAK     62 CNTR
```

$\pi^\pm$

```
                      8  CHARGED PION  (140,JPG=0--)  I=1

                      8  CHARGED PI  MASS (MEV)

S 8M *     139.37     0.14               CROWE       54 CNTR  -
S 8M *     139.68     0.15               BARKAS      56 EMUL +
S 8M       139.580    0.015              SHAFER      65 CNTR

                      8  PI+ MU+ MASS DIFFERENCE (MEV)

S 8D        34.00     0.076              BARKAS      56 EMUL
S 8D        33.89     0.076              BARKAS      56 EMUL

                      8  CHAR.PI LIFETIME (UNITS 10**-9)
S 8T        25.6      0.5      0.5       CROWE       57 RVUE
S 8T 8000   25.46     0.32     0.32      ASHKIN      60 CNTR
S 8T        25.6      0.8      0.8       ANDERSON    60 CNTR
S 8T *                                   MERRISON    62 RVUE

                      8  CHARGED PION PARTIAL DECAY MODES

S 8P1     CHAR.PION INTO MU (MU-NEU)                          S 4S 2
S 8P2     CHAR.PION INTO E (E-NEU)                            S 3S 1
S 8P3     CHAR.PION INTO MU (MU-NEU) GAMMA                    S 4S 2S 0
S 8P4     CHAR.PION INTO PIO E (E-NEU)                        S 9S 3S 1

                      8  CHARGED PION BRANCHING RATIOS

S 8R1*    CHAR.PION INTO MU NEU GAMMA  (UNITS 10**-4)        (P3)/(P1)
S 8R1  26     1.24    0.25               CASTAGNOLI 58 EMUL

S 8R2*    CHAR.PION INTO E NEU         (UNITS 10**-4)        (P2)/(P1)
S 8R2         1.21    0.07               ANDERSON    60 CNTR
S 8R2         1.247   0.028              DI CAPUA    64 CNTR

S 8R3*    CHAR.PION INTO PIO E NEU     (UNITS 10**-8)        (P4)/(P1)
S 8R3* 10     2.0     0.6                BACASTOW    62 CNTR
S 8R3  52     1.17    0.12               DEPOMMIER   64 CNTR
S 8R3  43     1.1     0.2                DUNAITSEV   64 CNTR
S 8R3  36     0.97    0.20               BARTLETT    64 SPRK
S 8R3  38     1.07    0.21               BACASTOW    65 SPRK +
```

π^0

```
                      9  NEUTRAL PION  (135,JPG=0--)  I=1

                      9  PI MASS DIFFERENCE (PI+-)-(PIO)(MEV)

S 9D          5.37    1.0                PANOFSKY    51 CNTR  -
S 9D          4.50    0.31               CHINOWSKY   54 CNTR  -
S 9D          4.62    0.05               HADDOCK     59 CNTR  -
S 9D          4.60    0.04               HILLMAN     59 CNTR
S 9D          4.55    0.07               CASSELS     59 CNTR

S 9D          4.6056  0.0055             CZIRR       63 CNTR
S 9D          4.59    0.03               PETRUKHIN   63 CNTR  -

                      9  PIO  LIFETIME (UNITS 10**-16)

S 9T   76     1.9     0.5      0.5       GLASSER     61 EMUL
S 9T   45     2.3     1.1      1.0       TIETGE      62 EMUL
S 9T   88     2.8     0.9      0.9       KOLLER      63 EMUL
S 9T          1.05    0.18     0.18      VON DARDEL  63 CNTR

S 9T   47     1.25    0.57     0.45      EVANS       63 EMUL
S 9T   75     1.7     0.5                SHWE        64 EMUL

                      9  NEUTRAL PION PARTIAL DECAY MODES

S 9P1     PIO INTO 2GAMMA                                     S 0S 0
S 9P2     PIO INTO E+ E- GAMMA                                S 3S 3S 0
S 9P3     PIO INTO 4ELECTRONS                                 S 3S 3S 3S 3

                      9  NEUTRAL PION BRANCHING RATIOS

S 9R1*    PIO INTO (GAMMA E+ E-)/(2GAMMA)                    (P2)/(P1)
S 9R1        0.01187  0.00048            SAMIOS      61 HBC
S 9R1*    USING  PANOFSKY RATIO = 1.54
S 9R1  27    0.0117   0.0015             BUDAGOV     60 HBC
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REFERENCES FOR TABLES ON STABLE PARTICLES

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IDENTIFIC.  YR AUTHORS                            JOUR.VOL PAGE YR INSTITUTION    COD
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ν_e

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                      1  E-NEUTRINO  (0,J=1/2)

LANGER      52 CNTR L M LANGER , RJD MOFFAT PR     88  689 52 INDIANA          S 1
HAMILTON    53 CNTR D R HAMILTON +          PR     92 1521 53 PRINCETON        S 1
FRIEDMAN    58 CNTR L FRIEDMAN , L G SMITH  PR    109 2214 58 B N L            S 1
```

ν_μ

```
                      2  MU-NEUTRINO  (0,J=1/2)

BARKAS      56 EMUL W H BARKAS +            PR    101  778 56 L R L            S 2
DUDZIAK     59 CNTR W DUDZIAK +             PR    114  336 59 L R L            S 2
BARDON      65 SPRK BARDON,NORTON,PEOPLES + PRL    14  449 65 COLUMBIA         S 2
SHAFER      65 CNTR SHAFER,CROWE,JENKINS    PRL    14  923 65 L R L            S 2
```

e

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                      3  ELECTRON  (0.5,J=1/2)

SCHUPP      61 CNTR SCHUPP,PIDD,CRANE       PR    121    1 61 MICHIGAN         S 3
COHEN       63 RVUE E R COHEN ,JWM DUMOND   REPORT IUPAP  63 RVUE             S 3
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μ

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                      4  MUON  (106,J=1/2)

FISHER      59 CNTR J FISHER +              PRL     3  349 59 CERN             S 4
ASTBURY     60 CNTR A ASTBURY +             ROCH   60  542 60 LIVERPOOL        S 4
DEVONS      60 XRAY S DEVONS +              PRL     5  330 60 COLUMBIA         S 4
LATHROP     60 XRAY J LATHROP +             NC     17  109 60 CHICAGO          S 4
LATHROP     60 XRAY J LATHROP +             NC     17  114 60 CHICAGO          S 4
REITER      60 CNTR R A REITER +            PRL     5   22 60 CARNEGIE         S 4
TELEGDI     60 CNTR V L TELEGDI             ROCH   60  713 60 CHICAGO          S 4

CHARPAK     61 CNTR G CHARPAK +             PRL     6  128 61 CERN             S 4
HUTCHINSON  61 CNTR D P HUTCHINSON +        PRL     7  129 61 COLUMBIA         S 4

ALIKHANOV   62 SPRK A I ALIKHANOV +         CERN       423 62 ITEP             S 4
CHARPAK     62 CNTR G CHARPAK +             PL      1   16 62 CERN             S 4
FARLEY      62 CNTR F J M FARLEY +          CERN   62  415 62 CERN             S 4
LUNDY       62 CNTR R A LUNDY               PR    125 1686 62 CHICAGO          S 4
PARKER 1    62 CNTR S PARKER, S PENMAN      NC     23  485 62 EFINS            S 4
SHAPIRO     62 RVUE G SHAPIRO +             PR    125 1022 62 COLUMBIA         S 4

BABAEV      63 SPKK A I BABAEV +            JETP   16 1397 63 ITEP             S 4
ECKHAUSE    63 CNTR M ECKHAUSE              PR    132  422 63 CARNEGIE         S 4
FEINBERG    63 RVUE G FEINBERG, LM LEDERMAN ARNS   13  431 63 RVUE             S 4
FRANKEL 1   63 SPRK S FRANKEL +             NC     27  894 63 PEN + LRL        S 4
FRANKEL 2   63 CNTR S FRANKEL +             PR    130  351 63 PEN + LRL        S 4
MEYER       63 CNTR S L MEYER  +            PR    132 2693 63 COLUMBIA         S 4
PARKER 2    64 SPRK PARKER,ANDERSON,RAY     PR    133 B768 64 EFINS            S 4
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$\pi^\pm$

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                      8  CHARGED PION  (140,JPG=0--)  I=1

CROWE       54 CNTR K M CROWE,RH PHILLIPS   PR     96  470 54 L R L            S 8
BARKAS      56 EMUL BARKAS,BIRNBAUM,SMITH   PR    101  778 56 L R L            S 8
CROWE       57 RVUE K M CROWE               NC      5  541 57 STANFORD         S 8
CASTAGNOLI  58 EMUL C CASTAGNOLI,M MUCHNICH PR    112 1779 58 ROME             S 8

ANDERSON    60 CNTR H L ANDERSON +          PR    119 2050 60 EFINS            S 8
ASHKIN      60 CNTR J ASHKIN +              NC     16  490 60 CERN             S 8
BACASTOW    62 CNTR R BACASTOW +            PRL     9  400 62 L R L            S 8
MERRISON    62 RVUE A W MERRISON            ADVP   11    1 62 LIVERPOOL        S 8
SHAPIRO     62 RVUE G SHAPIRO +             PR    125 1022 62 COLUMBIA         S 8

CZIRR       63 CNTR J B CZIRR               PR    130  341 63 L R L            S 8
DUNAITSEV   63 CNTR A F DUNAITSEV +         BNL        344 63 JINR             S 8

BARTLETT    64 SPRK BARTLETT,DEVONS,MEYER+  PR    136B1452 64 COLUMBIA         S 8
DEPOMMIER   64 CNTR DEPOMMIER +             DUBNA         64 CERN             S 8
DI CAPUA    64 CNTR E DI CAPUA +            PR    133B1333 64 COLUMBIA         S 8
DUNAITSEV   64 CNTR DUNAITSEV,PETRUKHIN +   TO BE PUBL.   64 JINR             S 8
BACASTOW    65 SPRK BACASTOW,GHESQUIERE +   PREPRINT(SLAC)65 LRL+SLAC         S 8
CLINE       65 PBC  CLINE,FRY               PRL    15  293 65 WISCONSIN        S 8
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π^0

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                      9  NEUTRAL PION  (135,JPG=0--)  I=1

PANOFSKY    51 CNTR PANOFSKY,AAMODT,HADLEY  PR     81  565 51 L R L            S 9
CASSELS     59 CNTR J M CASSELS +           PPS    74   92 59                  S 9
CHINOWSKY   54 CNTR W CHINOWSKY,STEINBERGER PR     93  586 54 COLUMBIA         S 9
HADDOCK     59 CNTR R P HADDOCK             PRL     3  478 59 L R L            S 9
HILLMANN    59 CNTR P HILLMAN +             NC     14  887 59                  S 9

BUGADOV     60 HBC  YU BUGADOV, WIKTOR      JETP 11   755 60 JINR             S 9
GLASSER     61 EMUL R G GLASSER +           PR    123 1014 61 NAVAL RES        S 9
SAMIOS      61 HBC  N P SAMIOS              PR    121  275 61 COLUMBIA+BNL     S 9
TIETGE      62 EMUL J TIETGE +              PR    127 1324 62 M PLANCK         S 9

CZIRR       63 CNTR J B CZIRR               PR    130  341 63 L R L            S 9
EVANS       63 EMUL D EVANS, J MULVEY       SIENA      477 63 OXFORD           S 9
KOLLER      63 EMUL E L KOLLER +            NC     27 1405 63 STEVENS          S 9
PETRUKHIN   63 CNTR VI PETRUKHIN,PROKOSHKIN SIENA      208 63 DUBNA            S 9
VON DARDEL  63 CNTR G VON DARDEL +          PL      4   51 63 CERN             S 9
SHWE        64 EMUL SHWE,SMITH,BARKAS       PR    136 B1839 64 L R L           S 9
```

DATA FOR TABLES ON STABLE PARTICLES Cont'd.

STABLE MEANING IMMUNE TO STRONG DECAY

```
CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
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K±

```
                      10  CHARGED K  (494,JP=0-)  I=1/2

                      10  CHARGED K  MASS (MEV)

S10M        493.9     0.2                 COHEN       57 RVUE +
S10M        493.7     0.3                 BARKAS      63 EMUL  -

                      10  CHAR.K  LIFETIME (UNITS 10**-8)

S10T          0.95    0.36      0.25      ILOFF       56 EMUL
S10T          1.211   0.026     0.026     FITCH       57 CNTR
S10T          1.227   0.015     0.015     ALVAREZ     57 CNTR
S10T    52    1.60    0.3       0.3       EISENBERG   58 EMUL
S10T          1.21    0.06      0.06      BURROWES    59 CNTR

S10T    33    1.38    0.24      0.24      FREDEN      60 EMUL
S10T    51    1.27    0.36      0.23      BHOWMIK     61 EMUL
S10T   293    1.31    0.08      0.08      NORCIN      61 H BC
S10T          1.25    0.22      0.17      BARKAS      61 EMUL
S10T          1.231   0.011     0.011     BOYARSKY    62 CNTR

                      10  CHARGED K PARTIAL DECAY MODES

S10P1      CHAR. K INTO MU (NEU)              K MU 2          S 4S 2
S10P2      CHAR. K INTO PI PIO                K PI 2          S 8S 9
S10P3      CHAR. K INTO PI PI+ PI-            TAU             S 8S 8S 8
S10P4      CHAR. K INTO PI 2PIO               TAU PRIME       S 8S 9S 9
S10P5      CHAR. K INTO MU PIO NEU            K MU 3          S 4S 9S 2
S10P6      CHAR. K INTO E PIO NEU             K E  3          S 3S 9S 1
S10P7      POSIT.K INTO PI+ PI- E+NEU         K E+ 4          S 8S 8S 3S 1
S10P8      POSIT.K INTO PI+ PI+ E-NEU         K E- 4          S 8S 8S 3S 1
S10P9      CHAR. K INTO PI PIO GAMMA                          S 8S 9S 0
S10P1 0    CHAR. K INTO PI E+ E-                              S 8S 3 S 3
S10P1 1    CHAR. K INTO PI PI MU NEU          K MU+ 4         S 8S 8S 4S 2
S10P1 2    CHAR. K INTO E NEU                 KE2             S 3S 1
S10P1 3    CHAR. K INTO PI MU+ MU-                            S 85 4S 4
S10P1 4    CHAR. K INTO PI PI+ PI- GAMMA                      S 8S 8S 8S 0

                      10  CHARGED K BRANCHING RATIOS

S10R1*     CHAR. K INTO MU NEU (MU2)      (UNITS 10**-2)       (P1)/TOTAL
S10R1        58.5        3.0               BIRGE       56 EMUL +
S10R1        56.9        2.6               ALEXANDER   57 EMUL +
S10R1        64.2        1.3               ROE         61 XBC  +
S10R1        63.0        0.8               SHAKLEE     64 XBC  +

S10R2*     CHAR. K INTO PI PIO (PI2)      (UNITS 10**-2)       (P2)/TOTAL
S10R2        27.7        2.7               BIRGE       56 EMUL +
S10R2        23.2        2.2               ALEXANDER   57 EMUL +
S10R2        18.6        0.9               ROE         61 XBC  +
S10R2        22.4        0.8               SHAKLEE     64 XBC  +
S10R2        21.0        0.6               CALLAHAN    65 PBC

S10R3*     CHAR. K INTO PI PI+ PI-(TAU)   (UNITS 10**-2)       (P3)/TOTAL
S10R3         5.6        0.4               BIRGE       56 EMUL +
S10R3         6.8        0.4               ALEXANDER   57 EMUL +
S10R3         5.2        0.3               TAYLOR      59 EMUL +
S10R3         5.7        0.3               ROE         61 XBC  +
S10R3         5.1        0.2               SHAKLEE     64 XBC  +
S10R3 2332    5.54       0.12              CALLAHAN    64 XBC  +

S10R4*     CHAR. K INTO PI 2PIO (TAU PRIME)(UNITS 10**-2)      (P4)/TOTAL
S10R4         2.1        0.5               BIRGE       56 EMUL +
S10R4         2.2        0.4               ALEXANDER   57 EMUL +
S10R4         1.5        0.2               TAYLOR      59 EMUL +
S10R4         1.7        0.2               ROE         61 XBC  +
S10R4         1.8        0.2               SHAKLEE     64 XBC  +

S10R5*     CHAR. K INTO MU PIO NEU (MU3) (UNITS 10**-2)        (P5)/TOTAL
S10R5         2.8        1.0               BIRGE       56 EMUL +
S10R5         5.9        1.3               ALEXANDER   57 EMUL +
S10R5         2.8        0.4               TAYLOR      59 EMUL +
S10R5         4.8        0.6               ROE         61 XBC  +
S10R5         3.0        0.5               SHAKLEE     64 XBC  +

S10R6*     CHAR. K INTO E PIO NEU (E3)    (UNITS 10**-2)       (P6)/TOTAL
S10R6         5.1        1.3               ALEXANDER   57 EMUL +
S10R6         3.2        1.3               BIRGE       56 EMUL +
S10R6         5.0        0.5               ROE         61 XBC  +
S10R6         4.7        0.3               SHAKLEE     64 XBC  +

S10R7*     POSIT.K INTO PI+ PI- E+ NEU    (UNITS 10**-5)       (P7)/TOTAL
S10R7  75     4.3        0.9               BIRGE       64 FBC  +

S10R8*     POSIT.K INTO PI+ PI+ E- NEU    (UNITS 10**-5)       (P8)/TOTAL
S10R8*  0      0.1 OR LESS                 BIRGE       64 FBC  +

S10R9*     CHAR. K INTO (MU PIO NEU)/(PI PI+ PI-)              (P5)/(P3)
S10R9 1220    0.61       0.05              BISI        64 PBC

S10R1*0    CHAR. K INTO PI PIO GAMMA      (UNITS 10**-4)       (P9)/TOTAL
S10R1*0 18    2.2        0.7               CLINE       64 FBC  +
S10R1*0   PREVIOUS RESULT FOR PI+ KIN.EN. (55-90) MEV

S10R1*1    POS.K INTO(PI+ PI- MU+ NEU)/TAU (UNITS 10**-3)      (P11)/(P3)
S10R1*1 1     0.25    APPROX               GREINER     64 EMUL +

S10R1*2    CHAR. K INTO (PI E+ E-)/TOTAL (UN 10**-6)           (P10)/TOTAL
S10R1*2 1     1.1      OR LESS             CAMERINI    64 FBC  +

S10R1*3    POS. K INTO (E PIO NEU)/(PI+ PI+ PI-)               (P6)/(P3)
S10R1*3230  0.90         0.06              BORREANI    64 HBC  +

S10R1*4    CHA.K INTO E NEU(E2)          (UNITS 10**-3)        (P12)/TOTAL
S10R1*4       1.6      OR LESS             BORREANI    64 HBC  +

S10R1*5    CHAR. K INTO(PI MU+ MU-)/TOTAL (UN 10**-6)          (P13)/TOTAL
S10R1*5       3.0      OR   LESS           CAMERINI    65 PBC  +

S10R1*6    POSI. K INTO (PI+PI-MU+NEU)/TOTAL  (UN 10**-5)      (P11)/TOTAL
S10R1*6 1     1.2      OR   LESS           CLINE       65 PBC  +

S10R1*7    CHAR. K INTO TAU PRIME/TAU                          (P4)/(P3)
S10R1 7       0.303      0.009             BISI        65 HBC  +

S10R1*8    CHAR. K INTO(PI PI+ PI- GAM)/TAU     (UN 10**-3) (P14)/(P3)
S10R1 8 7     1.7        0.7               STAMER      65 EMUL +
S10R1*8    PREVIOUS RESULT FOR GAM ENE. LESS THAN 1.1 MEV
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K⁰

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                      11  NEUTRAL K  (JP=0-)  I=1/2

                      11  KO MASS  (MEV)
S11M        498.1     0.4                 CHRISTENSON64 SPRK

                      11  KO-K CH. MASS DIFFERENCE (MEV)

S11D          3.9     0.6                 ROSENFELD  59 HBC   -
S11D          5.4     1.1                 CRAWFORD   59 HBC   +
S11D     9    3.90    0.25                BURNSTEIN  65 HBC   -
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K_1^0

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                      12  KO1 LIFETIME (UNITS 10**-10)
S12T    90    1.07      0.13      0.13      BOLDT       58 CC
S12T    62    0.81      0.23      0.15      BROWN       58 PBC
S12T    29    0.84      0.35      0.19      COOPER      58 CC
S12T    39    1.15      0.40      0.25      BLUMENFELD  58 CC
S12T   259    1.06      0.08      0.06      EISLER      58 PBC

S12T   512    0.94      0.05      0.05      CRAWFORD    59 HBC
S12T    63    1.09      0.18      0.15      BOWEN       60 CC
S12T   500    0.90      0.05      0.05      GARFINKEL   62 HBC
S12T   378    0.94      0.05      0.05      BERTANZA    62 HBC
S12T  2500    0.885     0.025     0.025     GOLDEN      62 HBC

S12T   503    0.87      0.05                CHRETIEN    63 PBC
S12T   545    0.86      0.04                KREISLER    64 SPRK
S12T  7786    0.849     0.014               FRANZINI    65 HBC

                      12  KO1 PARTIAL DECAY MODES

S12P1      KO1 INTO PI+ PI-                                      S 8S 8
S12P2      KO1 INTO PIO PIO                                      S 9S 9

                      12  KO1  BRANCHING RATIOS

S12R1*     KO1 INTO (PI+ PI-)/TOTAL                           (P1)/TOTAL
S12R1         0.68      0.09                CRAWFORD    59 HBC
S12R1         0.70      0.18                COLUMBIA    60 HBC
S12R1         0.74      0.07                ANDERSON    62 HBC

S12R2*     KO1 INTO (PIO PIO)/TOTAL                           (P2)/TOTAL
S12R2         0.27      0.11                CRAWFORD    59 HBC
S12R2         0.26      0.06                BAGLIN      60 PBC
S12R2         0.30      0.035               BROWN       61 XBC
S12R2 1066    0.335     0.014               BROWN       63 XBC
S12R2  198    0.288     0.021               CHRETIEN    63 PBC
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REFERENCES FOR TABLES ON STABLE PARTICLES Cont'd


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IDENTIFIC.  YR AUTHORS                         JOUR.VOL PAGE YR INSTITUTION        COD
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K±

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                           10 CHARGED K  (494,JP=0-)  I=1/2

BIRGE       56 EMUL R W BIRGE +                NC      4  834 56 L R L              S10
ILOFF       56 EMUL E L ILOFF +                PR    102  927 56 L R L              S10
ALEXANDER   57 EMUL G ALEXANDER +              NC      6  478 57 DUBLIN             S10
ALVAREZ     57 CNTR L W ALVAREZ +              UCRL8030        57 L R L             S10
COHEN       57 RVUE E R COHEN,CROWE,DUMOND     FUND.CONS.PHYS57 RVUE                S10
FITCH       57 CNTR V FITCH +                  UCRL8030        57 PRINCETON         S10

EISENBERG   58 EMUL Y EISENBERG +              NC      8  663 58 BERN               S10
BURROWES    59 CNTR H C BURROWES +             PRL     2  117 59 M I T              S10
FREDEN      60 EMUL S C FREDEN +               PR    118  564 60 L R L LIVERMORE    S10
TAYLOR      59 EMUL S TAYLOR +                 PR    114  359 59 COLUMBIA           S10

BARKAS      61 EMUL W H BARKAS +               PR    124 1209 61 L R L              S10
BHOWMIK     61 EMUL B BHOWMIK +                NC     20  857 61 DELHI              S10
NORDIN      61 HBC  P NORDIN JR                PR    123 2168 61 L R L              S10
ROE         61 XBC  B P ROE +                  PRL     9  346 61 MICHIGAN+LRL       S10

BOYARSKY    62 CNTR A M BOYARSKY +             PR    128 2398 62 M I T              S10
BARKAS      63 EMUL BARKAS,DYER,HECKMAN        PRL    11   26 63 L R L              S10
BIRGE       63 FBC  R W BIRGE +                PRL    11   35 63 LRL+WISCON+BARI    S10

BIRGE       64 FBC  R W BIRGE +                DUBNA           64 LRL+WISCON+BARI   S10
BISI        64 PBC  BISI,BORREANI,CESTER +     PRL    12  490 64 TORINO             S10
BORREANI    64 HBC  BORREANI,RINAUDO +         PL     12  123 64 TORINO             S10
CALLAHAN    64 XBC  A.CALLAHAN +               PR    136 B1463 64 WISCONSIN         S10
CAMERINI    64 FBC  CAMERINI,CLINE,FRY +       PRL    13  318 64 WISCON.+LRL        S10

CLINE       64 FBC  D CLINE,W F FRY            PRL    12  101 64 WISCONSIN          S10
GREINER     64 EMUL GREINER,OSBORNE,BARKAS     PRL    13  284 64 L R L              S10
SHAKLEE     64 XBC  F.S.SHAKLEE+               PR    136 B1423 64 MICHIGAN          S10
CAMERINI    65 PBC  CAMERINI,CLINE,GIDAL +     NC     37 1795 65 WISCONSIN+LRL      S10
STAMER      65 EMUL STAMER,                    PR    138 B440 65 STEVENS INS.TEC.   S10
CALLAHAN    65 PBC  CALLAHAN,CLINE             PRL    15  129 65 WISCONSIN          S10
BISI        65 HBC  BISI,BORREANI,CESTER +     NC     35  768 65 TORINO             S10
CLINE       65 PBC  CLINE,FRY                  PL     15  293 65 WISCONSIN          S10

          QUANTUM NUMBERS DETERMINATIONS NOT REFERRED TO IN DATA CARDS

BLOCK       62 HEBC BLOCK,LENDINARA,MONARI     CERN         371 62 NWEST+BOLOGNA    S10
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K⁰

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                           11  NEUTRAL K  (JP=0-)  I=1/2

CRAWFORD    59 HBC  F S CRAWFORD +             PRL     2  112 59 L R L              S11
ROSENFELD   59 HBC  ROSENFELD,SOLMITZ,TRIPP    PRL     2  110 59 L R L              S11
BURNSTEIN   65 HBC  BURNSTEIN,RUBIN            PR    138 B895 65 MARYLAND           S11
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K_1^0

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                           12  KO1  (JP=0-)  I=1/2

BLUMENFELD  58 CC   H BLUMENFELD +             CERN         272 58 COLUMBIA         S12
BOLDT       58 CC   E BOLDT +                  PRL     1  150 58 M I T              S12
BROWN       58 PBC  J BROWN +                  CERN         272 58 MICHIGAN         S12
COOPER      58 CC   A COOPER +                 CERN         272 58 JUNGFRAU         S12
EISLER      58 PBC  F EISLER +                 CERN         272 58 COLUMBIA         S12

CRAWFORD    59 HBC  F S CRAWFORD +             PRL     2  266 59 L R L              S12
BAGLIN      60 PBC  C BAGLIN +                 NC     18 1043 60 ECOL.POLYT.        S12
BIRGE       60 PBC  R W BIRGE +                ROCH   60  601 60 L R L              S12
BOWEN       60 CC   T BOWEN +                  PR    119 2030 60 PRINCETON          S12
COLUMBIA    60 HBC  REPORTED VIA M SCHWARZ     ROCH         727 60 COLUMBIA         S12
MULLER      60 PBC  F MULLER +                 PRL     4  418 60 L R L              S12

BROWN       61 XBC  J L BROWN +                NC     19 1155 61 LRL+MICHIGAN       S12
FITCH       61 CNTR V L FITCH +                NC     22 1160 61 PRINCETON          S12
GOOD        61 PBC  R H GOOD +                 PR    124 1223 61 L R L              S12

ANDERSON    62 HBC  J A ANDERSON +             CERN         836 62 L R L            S12
BERTANZA    62 HBC  L BERTANZA,MONETI          PREPRINT D105 62 BROOKHAV.           S12
CRAWFORD    62 RVUE F S CRAWFORD               CERN         827 62 RVUE             S12
GARFINKEL   62 HBC  A F GARFINKEL              NEVIS104        62 COLUMBIA          S12
GOLDEN      62 HBC  R L GOLDEN                 CERN         839 62 L R L            S12

BROWN       63 XBC  J L BROWN +                PR    130  769 63 LRL+MICHIG         S12
CHRETIEN    63 PBC  M CHRETIEN +               PR    131 2208 63 BRA+BRO+HAR+MIT    S12
KREISLER    64 SPRK KREISLER,OVERSETH +        PR    136 B1074 64 PRINCETON         S12
WOJCICKI    63 HBC  S G WOJCICKI                               63 L R L             S12
KREISLER    64 SPRK KREISLER,OVERSETH +        PR    136 B1074 64 PRINCETON         S12
FRANZINI    65 HBC  FRANZINI,KIRSCH,SCHMIDT+PREP.NEVIS135 65 COLUMBIA+RUTGERSS12
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DATA FOR TABLES ON STABLE PARTICLES Cont'd.

STABLE MEANING IMMUNE TO STRONG DECAY

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CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
   IN PEAK

   * INDICATES DATA IGNORED BY PROGRAMS
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K_2^0

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                 13  KO2-KO1  MASS DIF.(UNITS OF 1/TAU1)

S13D *     FOR SIGN OF MASS DIFF.,SEE    MEISNER      63 HBC
S13D         . 1.9      0.3               FITCH        61 CNTR
S13D         0.84       0.29      0.21    GOOD         61 PBC
S13D         1.5        0.2               CAMERINI     62 PBC
S13D         0.5        0.1               CHRISTENSON63 SPRK

S13D         0.78       0.20              AUBERTI      64 PBC
S13D * 48    0.6        0.6               CRAWFORD     64 HBC
S13D         0.82       0.12              FUJII        64 SPRK
S13D         0.53       .18        .20    AUBERT       65 PBC     ASS.CP CONS.
S13D         0.26       0.36      0.26    BALDO-CEOLI65 PBC     ASS.CP CONS.

                 13  KO2 LIFETIME (NANOSEC)

S13T *      ASSUMED DS=DQ AND DELTA I=1/2 CRAWFORD    59 HBC
S13T    34   81.0       32.0      24.0     BARDON      58 CC
S13T    15   51.0       24.0       13.0    DARMON      62 FBC
S13T         54.0        6.0               FUJII       64 SPRK
S13T         61.0       15.0       12.0    ASTBURY     65 CC

                 13  KO2 PARTIAL DECAY MODES

S13P1      KO2 INTO 3PIO                                        S 9S 9S 9
S13P2      KO2 INTO PI+ PI- PIO                                 S 8S 8S 9
S13P3      KO2 INTO PI MU NEUTRINO                              S 8S 4S 2
S13P4      KO2 INTO PI E NEUTRINO                               S 8S 3S 1
S13P5      KO2 INTO PI+ PI-                                     S 8S 8
S13P6      KO2 INTO MU+ MU-                                     S 4S 4

                 13  KO2 DECAY RATES

S13W1*     KO2 INTO PIO PIO PIO          (UN. 10**6 SEC-1)  (P1)
S13W1  22    5.1        1.2               BRISSON     64 FBC

S13W2*     KO2 INTO PI+ PI- PO           (UN. 10**6 SEC-1)  (P2)
S13W2  38    2.61       0.57              BEHR        64 FBC
S13W2  18    3.26       0.77              ANDERSON    65 HBC

S13W3*     KO2 INTO PI E NEUTRINO        (UN. 10**6 SEC-1)  (P4)
S13W3        8.15       1.0               AUBERT      65 PBC

S13W4*     KO2 INTO CHARGED (THREE-BODY) (UN. 10**6 SEC-1)  (P2+P3+P4)
S13W4 107   15.8        1.9              'AUERBACH    65 SPRK

S13W5*     KO2 INTO LEPTONIC (KMU3+KE3)   (UN 10**6 SEC-1) (P3+P4)
S13W5 109    9.85       1.15      1.05    FRANZINI    65 HBC

                 13  KO2 BRANCHING RATIOS

S13R1*     KO2 INTO (PIO PIO PIO)/CHARGED                    (P1)/(P2+P3+P4)
S13R1        0.38       0.07              ANIKINA     62 CC

S13R2*     KO2 INTO (PI+ PI- PIO)/CHARGED                    (P2)/(P2+P3+P4)
S13R2 320    0.185     ,0.038     0.034   ASTIER      61 CC
S13R2 479    0.157     ,0.03              LUERS       64 HBC
S13R2         .15        .03              ASTBURY     65 CC

S13R3*     KO2 INTO (PI MU NEUTRINO)/CHARGED                 (P3)/(P2+P3+P4)
S13R3 479    0.356      0.07              LUERS       64 HBC
S13R3         .38        .08              ASTBURY     65 CC

S13R4*     KO2 INTO (PI E NEUTRINO)/CHARGED                  (P4)/(P2+P3+P4)
S13R4 479    0.487      0.05              LUERS       64 HBC
S13R4         .46        .08       .10    ASTBURY     65 CC

S13R5*     KO2 INTO (PI E NEU)/((PI E NEU)+(PI MU NEU))     (P4)/(P3+P4)
S13R5  320   0.415      0.120             ASTIER      61 CC

S13R6*     KO2 INTO(PI+ PI- PIO)/TOTAL                       (P2)/TOTAL
S13R6  16    0.18       0.05              STERN       64 HBC
S13R6  79    0.151     0.020              ADAIR       64 HBC

S13R7*     KO2 INTO(LEPTON PI NEUTRINO)/TOTAL                (P3+P4)/TOTAL
S13R7  14    0.58       0.17              ALEXANDER   62 HBC

S13R9*     KO2 INTO (PI+ PI-)/CHARGED     (UNIT 10**-3)      (P5)/(P2+P3+P4)
S13R9*  0   10.0      OR LESS             NEAGU       61 CC
S13R9*  0   15.0      OR LESS             LUERS       64 HBC
S13R9* 11    2.5      OR LESS             ABASHIAN    64 SPRK
S13R9  45    2.0        0.4               CHRISTENSON64 SPRK
S13R9  54    2.08       0.35              GALBRAITH   65 SPRK
S13R9  37    3.5        1.4               DE BOUARD   65 CNTR

S13R1*0    KO2 INTO (PI MU NEU)/(PI E NEU)                   (P3)/(P4)
S13R1 0      0.78       0.15              DE BOUARD   65 CNTR

S13R1*1    KO2 INTO (MU+MU-)/CHARGED      (UN. 10**-4)       (P6)/(P2+P3+P4)
S13R1*1 0    2.0      OR LESS             DE BOUARD   65 CNTR
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                 14  ETA (549,JPG=0-+)  I=0

                 14  ETA  MASS (MEV)

S14M   53  549.0        1.2               BASTIEN     62 HBC
S14M   35  546.0        4.0               PICKUP      62 HBC
S14M   91  548.0        1.0               ALFF        62 HBC
S14M       549.3        2.9               DELCOURT    63 CNTR
S14M  148  549.0        0.7               FOELSCHE    64 HBC
S14M  325  552.0        3.0               KRAEMER     64 DBC

                 14  ETA  WIDTH (MEV)

S14W * 53    12 OR LESS                   BASTIEN     62 HBC
S14W * 91    10 OR LESS                   ALFF        62 HBC
S14W *325   16.0    OR LESS               KRAEMER     64 DBC
S14W *148    10 OR LESS                   FOELSCHE    64 HBC

                 14  ETA PARTIAL DECAY MODES

S14P1      ETA INTO 2GAMMA                                      S 0S 0
S14P2      ETA INTO 3PIO AND PIO 2 GAMMA, CALLED 3PIO           S 9S 9S 9
S14P3      ETA INTO PI+ PI- PIO                                 S 8S 8S 9
S14P4      ETA INTO PI+ PI- GAMMA                               S 8S 8S 0
S14P5      ETA INTO   E+E-PIO                                   S 9S 3S 3

                 14 ETA   BRANCHING RATIOS

S14R1*     ETA INTO NEUTRAL/CHARGED                          (P1+P2)/(P3+P4)
S14R1  10    2.5        1.0               PICKUP      62 HBC
S14R1  53    3.20       1.26              BASTIEN     62 HBC
S14R1  91    2.5        0.5               ALFF        62 HBC
S14R1        2.7        0.8               SHAFER      62 HBC
S14R1 280    3.6        0.8               KRAEMER     64 DBC
S14R1  57    2.2        0.35              PAULI       64 DBC

S14R2*     ETA INTO 2GAMMA/CHARGED                           (P1)/(P3+P4)
S14R2        0.99       0.48              CRAWFORD    63 HBC

S14R3*     ETA INTO 3PIO/CHARGED                             (P2)/(P3+P4)
S14R3        0.66       0.25              CRAWFORD    63 HBC

S14R4*     ETA INTO (PI+ PI- GAMMA)/(PI+ PI- PIO)            (P4)/(P3)
S14R4        0.26       0.08              FOWLER      63 HBC
S14R4        0.14       0.08              FOELSCHE    64 HBC
S14R4  24    0.73       0.25              PAULI       64 DBC

S14R5*     ETA INTO 3PIO/(PI+ PI- PIO)                       (P2)/(P3)
S14R5        2.0        1.0               FOELSCHE    64 HBC
S14R5        0.90       0.24              FOSTER      65 HBC

S14R6*     ETA INTO 2GAMMA/3PIO                              (P1)/(P2)
S14R6*       1.1        0.3 OR LESS       CHRETIEN    62 PBC
S14R6        0.80       0.25              BACCI       63 CNTR
S14R6        1.10       0.5               MULLER      63 DBC
S14R6  24    3.7        0.9               BAZIN       64 HBC

S14R7*     ETA INTO 2GAMMA/(PI+ PI- PO)                      (P1)/(P3)
S14R7        1.61       0.39              FOSTER      64 HBC

S14R8*     ETA INTO NEUTRAL/(PI+ PI- PIO)                    (P1+P2)/(P3)
S14R8 280    3.6        0.8               KRAEMER     64 DBC

S14R9*     ETA INTO  (E+E-PIO)/(PI+PI-PIO)     (UN 10**-2) (P5)/(P3)
S14R9*  0    0.77     OR LESS             FOSTER      65 HBC
S14R9*     LESS THAN    1.1        1.1    PRICE       65 HBC
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REFERENCES FOR TABLE ON STABLE PARTICLES Cont'd.


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IDENTIFIC.  YR AUTHORS                        JOUR.VOL PAGE YR INSTITUTION      COD
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K_2^0

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                      13  KO2  (JP=0-)  I=1/2

BARDON      58 CC   M BARDON ET AL           ANP    5  156 58 COLUMBIA          S13
CRAWFORD    59 HBC  F S CRAWFORD +           PRL    2  361 59 L R L             S13
ASTIER      61 CC   A ASTIER +               AIX    1  227 61 ECOLE POLYT.      S13
FITCH       61 CNTR V L FITCH,PIROUE,PERKINSNC     22 1160 61 PRINC+LOSALA.     S13
GOOD        61 PBC  R H GOOD +               PR   124 1223 61 L R L             S13
NEAGU       61 CC   D NEAGU +                PRL    6  552 61 JINR (MOSCOW)     S13

ALEXANDER   62 HBC  G ALEXANDER +            PRL    9   69 62 L R L             S13
ANIKINA     62 CC   M H ANIKINA +            CERN      452 62 DUBNA             S13
CAMERINI    62 PBC  U CAMERINI +             PR   128  362 62 WISCONSIN+LRL     S13
DARMON      62 FBC  J DARMON,ROUSSET,SIX     PL     3   57 62 EP                S13

CHRISTENSON 63 SPRK J H CHRISTENSON +        BNL        74 63 PRINCETON         S13
JOVANOVICH  63 SPRK J V JOVANOVICH +         BNL        42 63 BNL/MD            S13
MEISNER     63 HBC  G W MEISNER,CRAWFORD+    BNL        67 63 L R L             S13

ABASHIAN    64 SPRK ABASHIAN,ABRAMS +        PRL   13  243 64 ILLINOIS          S13
ADAIR       64 HBC  ADAIR,LEIPUNER           PL    12   67 64 YALE,BNL          S13
AUBERT 1    64 PBC  B AUBERT +               PL    10  215 64 ECOLE POLYTEC.    S13
BEHR        64 FBC  BEHR,AUBERT,BELLOTTI+    DUBNA            64 EP+MILAN       S13
BRISSON     64 FBC  BRISSON,BEHR,BELLOTTI+   DUBNA            64 EP+MILAN       S13

CRAWFORD    64 HBC  CRAWFORDS,GOLDEN,MEISNERBAPS  9  443 64 L R L             S13
CHRISTENSON 64 SPRK CHRISTENSON,CRONIN,FITCHPRL  13  139 64 PRINCETON         S13
FUJII       64 SPRK T.FUJII +                PRL   13  253 64 BNL + MARYLAND    S13
LUERS       64 HBC  D LUERS +                PR   133 B1277 64 B N L            S13
STERN       64 HBC  D STERN +                PRL   12  459 64 WISCONSIN+LRL     S13

ANDERSON    65 HBC  ANDERSON,CRAWFORD,GOLDENPRL  14  475 65 L R L             S13
ASTBURY     65 CC   ASTBURY,FINOCCHIARO +    PL    16   80 65 CERN+ZURICH       S13
ASTBURY     65 CC   ASTBURY,MICHELINI +      PREPRINT         65 CERN,ZURICH    S13
AUBERT      65 PBC  AUBERT,BEHR,CANAVAN+     PL    17   59 65 PARIS,ORSAY       S13
AUERBACH    65 SPRK AUERBACH,LANDE,MANN +    PRL   14  192 65 PENNSYLVANIA      S13
BALDO-CEOLIN65 PBC  BALDO-CEOLIN,CALIMANI + NC    38  684 65 PADUA             S13
DE BOUARD   65 CNTR DE BOUARD,DEKKERS +      PL    15   58 65 CERN+ORSAY+MPI    S13
FRANZINI    65 HBC  FRANZINI,KIRSCH,SCHMIDT+PREP.NEVIS135 65 COLUMBIA+RUTGERSS13
GALBRAITH   65 SPRK GALBRAITH,MANNING +      PRL   14  383 65 HARW+BRI+RUTH     S13
PRICE       65 HBC  PRICE,CRAWFORD           PRL   15  123 65 L R L             S13
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                      14  ETA (549,JPG=0-+)  I=0

PEVSNER     61 HBC  A PEVSNER +              PRL    7  421 61 HOPKINS/N-WSTRN S14
ALFF        62 HBC  C ALFF +                 PRL    9  322 62 COLUMBIA+RUTU   S14
BASTIEN     62 HBC  PL BASTIEN +             PRL    8  114 62 L R L           S14
CHRETIEN    62 PBC  M CHRETIEN  +            PRL    9  127 62 BRA+BRO+HA+MIT+PS14
FOELSCHE    62 HBC  HW FOELSCHE,+            PRL    9  223 62 YALE            S14
PICKUP      62 HBC  E PICKUP +               PRL    8  329 62 MRC OTTAWA+ BNL S14
SHAFER      62 HBC  J BUTTON-SHAFER +        CERN      309 62 L R L           S14

BACCI       63 CNTR C BACCI +                PRL   11   37 63 FRASCATI        S14
BERTHELOT   63 RVUE A BERTHELOT              SIENA  2   64 63 RVUE            S14
BUSCHBECK-CZ63 HBC  B BUSCHBECK-CZAPP +      SIENA  1  166 63 VIENNA-CERN-AR  S14
CRAWFORD    63 HBC  F S CRAWFORD +           PRL   10  546 63 L R L +DUKE     S14
DELCOURT    63 CNTR B DELCOURT +             PL     7  215 63 ENS-ORSAY       S14
FOWLER      63 HBC  E C FOWLER +             PRL   10  110 63 DUKE+LRL        S14
MULLER      63 DBC  A MULLER +               SIENA      99 63 SACLAY+ROME     S14

FOELSCHE    64 HBC  H.FOELSCHE+H.L.KRAYBILL PR  134 B1138 64 YALE            S14
FOSTER      64 HBC  FOSTER,PETERS,HARTUNG + PR   138 B652 65 WISCON+PURDUE   S14
KRAEMER     64 DBC  KRAEMER,FIELDS,TOOHIG + PR   136 B496 64 JHU,N-WES,WO COLS14
PAULI       64 DBC  E PAULI,A MULLER         PL    13  351 64 SACCLAY         S14

FOSTER      65 HBC  FOSTER,GOOD,MEER         ATHENS           65 WISCONSIN,PURDU S14

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

BASTIEN     62 HBC  PL BASTIEN +             PRL    8  114 62 I,J,P,G,C       S14
CARMONY     62 HBC  D D CARMONY +            PRL    8  117 62 I,J             S14
ROSENFELD   62 HBC  A H ROSENFELD +          PRL    8  293 62 G               S14
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DATA FOR TABLES ON STABLE PARTICLES Cont'd.

STABLE MEANING IMMUNE TO STRONG DECAY

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CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS

p                    16  PROTON  (938,J=1/2)  I=1/2

                     16  PROTON  MASS (MEV)

S16M       938.256   0.005               COHEN      63 RVUE

                     16  PROTON LIFETIME  (UNITS 10**26 YR)

S16T *     OVER                1.5       BACKENSTOSS60 CNTR
S16T *     OVER                1.0       GIAMATI    62 CNTR

                     16 PROTON MAGNET. MOMENT(E/2MP)

S16MM      2.792816 0.000034             SCHUPP     61 CNTR

                     17  NEUTRON (939,J=1/2)  I=1/2
n
                     17  NEUTRON-PROTON MASS DIF.(MEV)

S17D         1.2939  0.0004              BONDELID   60 CNTR
S17D         1.2933  0.0001              SALGO      64 CNTR

                     17  NEUTRON LIFETIME (UNITS 10**3)

S17T         1.01    0.03      0.03      SOSNOVSKIJ 59 PILE

                     17  NEUTRON MAGNETIC MOMENT (MAGNETONS,938.2 MEV)

S17MM     -1.913148  0.000066            COHEN      57 RVUE

Λ                    18  LAMBDA (1115,JP=1/2+)  I=0

                     18  LAMBDA  MASS (MEV)

S18M       1115.25   0.36                BALTAY     62 HBC
S18M    25 1115.04   0.41                ARMENTEROS 62 HBC
S18M   317 1115.40   0.13                BHOWMIK    63 RVUE
S18M *     LAMBDA MASS TO BE RAISED OF  0.043 BECAUSE PROTON MASS RAISED
S18M *     1115.84   0.31                SCHMIDT    64 HBC

                     18  LAMBDA LIFETIME (UNITS 10**-10)

S18T  188    2.63    0.21      0.21      BOLDT      58 CC
S18T   74    2.75    0.45      0.38      BLUMENFELD 58 CC
S18T   61    2.08    0.46      0.31      BROWN      58 PBC
S18T   40    3.04    0.78      0.51      COOPER     58 CC
S18T  454    2.29    0.15      0.13      EISLER     58 HBC

S18T  825    2.72    0.16      0.16      CRAWFORD   59 HBC
S18T  140    2.72    0.29      0.27      BOWEN      60 CC
S18T  600    2.69    0.14      0.12      FUNG       62 PBC
S18T  799    2.69    0.11      0.11      HUMPHREY   62 HBC
S18T  748    2.58    0.11      0.11      BERTANZA   62 HBC

S18T  900    2.44    0.11      0.11      GARFINKEL  62 HBC
S18T 2250    2.31    0.09      0.09      CRONIN     62 SPRK
S18T 5000    2.68    0.03      0.03      GOLDEN     62 HBC
S18T         2.60    0.28      0.20      C-C CHANG  62 HBC
S18T 2500    2.70    0.07      0.07      MURRAY     62 HBC

S18T 2239    2.36    0.06      0.06      BLOCK      63 HEBC
S18T  820    2.75    0.12      0.12      BERGE      63 HBC
S18T  706    2.76    0.20                CHRETIEN   63 PBC
S18T  794    2.59    0.09                HUBBARD    64 HBC
S18T 1378    2.59    0.07                SCHWARTZ   64 HBC
S18T 2260    2.31    0.10                KREISLER   64 SPRK

S18T         2.6     0.1                 HILL       65 SPRK

                     18  LAMBDA PARTIAL DECAY MODES

S18P1      LAMBDA INTO PROTON PI-                             S16S 8
S18P2      LAMBDA INTO NEUTRON PIO                            S17S 9
S18P3      LAMBDA INTO PROTON MU- NEUTRINO                    S16S 4S 2
S18P4      LAMBDA INTO PROTON E- NEUTRINO                     S16S 3S 1

                     18  LAMBDA BRANCHING RATIOS

S18R1*     LAMBDA INTO (P PI-)/((P PI-)+(N PIO))              (P1)/(P1+P2)
S18R1        0.627   0.031               CRAWFORD   59 HBC
S18R1        0.65    0.05                COLUMBIA   60 HBC
S18R1 903    0.643   0.016               HUMPHREY   62 HBC
S18R1        0.685   0.017               ANDERSON   62 HBC

S18R2*     LAMBDA INTO (N PIO)/((P PI-)+(N PIO))              (P2)/(P1+P2)
S18R2        0.23    0.09                EISLER     57 PBC
S18R2        0.43    0.14                CRAWFORD   59 HBC
S18R2        0.28    0.08                BAGLIN     60 PBC
S18R2        0.35    0.05                BROWN      63 XBC
S18R2  75    0.291   0.034               CHRETIEN   63 PBC

S18R3*     LAMBDA INTO (P E- NEU)/TOTAL  (UNITS  10**-3)  (P4)/(P1+P2)
S18R3  15    2.0     0.5                 HUMPHREY   61 RVUE
S18R3   8    2.9     1.5       1.2       AUBERT     62 FBC
S18R3 150    0.82    0.12      0.13      ELY        63 FBC
S18R3  20    1.55    0.34                LIND       64 HBC
S18R3 102    0.78    0.12                BAGLIN     64 FBC

S18R4*     LAMBDA INTO (P MU- NEU)/TOTAL (UNITS  10**-4)  (P3)/(P1+P2)
S18R4*  1    0.2 OR GREATER              GOOD       62 HBC
S18R4*  1    1.0    OR LESS              ALSTON     63 HBC
S18R4*  2    1.0 OR LESS                 KERNAN     64 FBC
S18R4*      BETWEEN 1.3 AND 6.0          LIND       64 HBC
S18R4   2    1.5     1.2                 RONNE      64 FBC

                     18  LAMBDA MAGNETIC MOMENT (MAGNETONS,938.26 MEV)

S18MM      -1.5      0.5                 COOL       62 SPRK
S18MM       0.0      0.6                 KERNAN     63 CC
S18MM 8553 -1.37     0.72                ANDERSON   64 HBC
S18MM  151 -0.5      0.28                CHARRIERE  65 EMUL
S18MM 2534 -0.77     0.27                HILL       65 SPRK

                     18  LAMBDA DECAY PARAMETERS

S18A *     ALPHAO /ALPHA- FOR LAMBDA (L INTO PIO N/L INTO PI- P)

S18A *       1.10    0.27                CORK       60 CNTR

S18A-*     ALPHA LAMBDA- (LAMBDA INTO PI- PROTON)

S18A-        0.66    0.05                CRONIN     63 CNTR
S18A-        0.683   0.066               MERRILL    65 HBC
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REFERENCES FOR TABLES ON STABLE PARTICLES Cont'd.

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IDENTIFIC.  YR AUTHORS                      JOUR.VOL PAGE YR INSTITUTION       COD

p                          16  PROTON  (938,J=1/2)  I=1/2

BACKENSTOSS 60 CNTR G K BACKENSTOSS +       NC     16  749 60 CERN              S16
SCHUPP      61 CNTR SCHUPP,PIDD,CRANE       PR    121    1 61 MICHIGAN          S16
GIAMATI     62 CNTR C C GIAMATI + F REINES  PR    126 2178 62 CASE IT           S16
COHEN       63 RVUE E R COHEN,JWM DUMOND    REPORT IUPAP  63 RVUE              S16

n                          17  NEUTRON (939,J=1/2)  I=1/2

COHEN       57 RVUE COHEN, CROWE,DUMOND     NC      5  541 57 REVUE             S17
SOSNOVSKIJ  59 PILE SOSNOVSKIJ +            JETP    9  717 59 RUSSIA            S17
BONDELID    60 CNTR R O BONDELID +          PR    120  887 60 USNR+CATOUNI.     S17
SALGO       64 CNTR SALGO,STAUB,WINKLER+    NP     53  457 64 ZURICH            S17

Λ                          18  LAMBDA (1115,JP=1/2+)  I=0

EISLER      57 PBC  F EISLER +              NC      5 1700 57 COLUMBIA+BNL      S18
BLUMENFELD  58 CC   H BLUMENFELD +          CERN       270 58 COLUMBIA          S18
BOLDT       58 CC   E BOLDT +               PRL     1  148 58 M I T             S18
BROWN       58 PBC  J BROWN +               CERN       270 58 MICHIGAN          S18
COOPER      58 CC   A COOPER +              CERN       270 58 JUNGFRAU          S18
EISLER      58 HBC  F EISLER +              CERN       270 58 COLUMBIA+PI+BO    S18

CRAWFORD    59 HBC  F S CRAWFORD +          PRL     2  266 59 L R L             S18
BAGLIN      60 PBC  C BAGLIN +              NC     18 1043 60 ECOLE POLYT       S18
BOWEN       60 CC   T BOWEN +               PR    119 2030 60 PRINCETON         S18
CORK        60 CNTR CORK,KERTH,WENZEL +     PR    120 1000 60 LRL+PRINC+BNL     S1[illegible]
COLUMBIA    60 HBC  REPORTED BY M SCHWARTZ. ROCH       726 60 COLUMBIA          S18
HUMPHREY    61 RVUE W E HUMPHREY +          PRL     6  478 61 L R L             S18

ANDERSON    62 HBC  J A ANDERSON +          CERN       832 62 L R L             S18
ARMENTEROS  62 HBC  R ARMENTEROS +          CERN       236 62 CERN ETC          S18
AUBERT      62 PBC  AUBERT,BRISSON,HENNESSY+NC     25  479 62 ECOLE POLYT.      S18
BALTAY      62 HBC  C BALTAY +              CERN       233 62 YALE,BRKH         S18
BERTANZA    62 HBC  L BERTANZA,MONETI       PREPRINT D105 62 B N L             S18

CHANG       62 HBC  C-C CHANG               NSA    16 2967662 DUKE              S18
COOL        62 SPRK COOL,JENKINS,KYCIA,HILL+PR    127 2223 62 B N L             S18
CRONIN      62 SPRK J CRONIN +              CERN       459 62 PRINCETON         S18
FUNG        62 PBC  S YIU FUNG              BAPS    7  619 62 L R L             S18
GARFINKEL   62 HBC  A F GARFINKEL           NEVIS104      62 COLUMBIA          S18
                                        AND PRIV COMM     63 COLUMBIA          S18
GOLDEN      62 HBC  R L GOLDEN +            CERN       839 62 L R L             S18
GOOD        62 HBC  M L GOOD,V G LIND       PRL     9  518 62 WISCONSIN         S18
HUMPREY     62 HBC  W HUMPREY,R ROSS        PR    127 1305 62 L R L             S18
MURRAY      62 HBC  MURRAY +                CERN       839 62 L R L             S18

ALSTON      63 HBC  M H ALSTON +            UCLRL    10926 63 L R L             S18
BERGE       63 HBC  J P BERGE               THESIS        63 L R L             S18
BHOMWIK     63 RVUE B BHOMWIK,DP GOYAL      NC     28 1494 63 RVUE              S18
BLOCK       63 HEBC M M BLOCK +             PR    130  766 63 N WESTERN         S18

BROWN       63 XBC  J L BROWN +             PR    130  769 63 LRL+MICHIG        S18
CHRETIEN    63 PBC  M   CHRETIEN +          PR    131 2208 63 BRA+BRO+HAR+MIT   S18
CRONIN      63 CNTR CRONIN,OVERSETH         PR    129 1795 63 PRINCETON         S18
ELY         63 FBC  R P ELY +               PR    131  868 63 LRL+UNIV.COL.     S18
KERNAN      63 CC   KERNAN,NOVEY,WARSHAW +  PR    129  870 63 ARGONNE           S18

ANDERSON    64 HBC  J.A.ANDERSON+F.S.CRAWFORD PRL 13  167 64 LRL               S18
BAGLIN      64 FBC  C BAGLIN +              NC     35  977 64 EP CE UCL RUT BES18
KREISLER    64 SPRK KREISLER,OVERSETH +     PR    136 B1074 64 PRINCETON        S18
KERNAN      64 PBC  A KERNAN +              PR    133 B1271 64 LRL+UNIV.COL.    S18
HUBBARD     64 HBC  J R HUBBARD +           PR    135 B 183 64 L R L

LIND        64 HBC  V.G.LIND +              PR    135 B1483 64 WISCONSIN        S18
RONNE       64 FBC  RONNE,BAGLIN,SIX +      PL     11  357 64 CE+EP+UCL+BERGENS18
SCHMIDT     64 HBC  SCMIDT,STEINBERGER +    PREPRINT      64 COLUMBIA          S18
SCHWARTZ    64 HBC  J SCHWARTZ              UCRL     11360 64 L R L             S18
CHARRIERE   65 EMUL CHARRIERE,GAILLOUD +    PL     15   66 65 LAU+BRI+CERN+MPIS18
HILL        65 SPRK HILL,LI,JENKINS,KYCIA+  PRL    15   85 65 MIT+BNL           S18
MERRILL     65 HBC  DEANE MERRILL           THESIS        65 L R L             S18
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DATA FOR TABLES ON STABLE PARTICLES Cont'd.

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CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
   IN PEAK

     INDICATES DATA IGNORED BY PROGRAMS
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                          19  SIGMA+   (1189,JP=1/2+)  I=1

                          19  SIGMA+ MASS (MEV)

S19M       1189.40     0.15                   BARKAS     63 EMUL
S19M       1189.5      0.5                    BURNSTEIN  64 HBC
S19M    58 1189.45     0.22                   BHOWMIK    64 EMUL
S19M *     1189.58     0.13                   SCHMIDT    64 HBC

                          19  SIGMA+ LIFETIME (UNITS 10**-10)

S19T *                                        GLASER     58 RVUE
S19T  127     0.98     0.16      0.12         PUSCHEL    60 EMUL
S19T   41     0.82     0.34      0.20         EVANS      60 EMUL
S19T  117     0.85     0.14      0.11         FREDEN     60 EMUL
S19T   54     0.80     0.10      0.067        KAPLON     60 EMUL

S19T   23     0.76     0.22      0.14         CHIESA     61 EMUL
S19T   49     0.75     0.13      0.09         BERTHELOT  61 PBC
S19T  140     0.82     0.10      0.08         BARKAS     61 EMUL
S19T  192     0.749    0.056     0.052        GRARD      62 HBC
S19T  456     0.765    0.04      0.04         HUMPHREY   62 HBC
S19T  203     0.84     0.12      0.08         BHOWMIK    64 EMUL

                          19  SIGMA+ PARTIAL DECAY MODES

S19P1      SIGMA + INTO PROTON PIO                               S16S 9
S19P2      SIGMA + INTO NEUTRON PI+                              S17S 8
S19P3      SIGMA + INTO NEUTRON PI+ GAMMA                        S17S 8S 0
S19P4      SIGMA + INTO LAMBDA E+ NEU                            S18S 3S 0
S19P5      SIGMA + INTO PROTON GAMMA                             S16S 0
S19P6      SIGMA + INTO NEUTRON MU+ NEUTRINO                     S17S 4S 2
S19P7      SIGMA + INTO NEUTRON E+ NEUTRINO                      S17S 3S 1

                          19  SIGMA+  BRANCHING RATIOS

S19R1*     SIGMA+  INTO (NEUTRON PI+)(NUCLEON PI)           (P2)/(P1+P2)
S19R1 308    0.490     0.024                  HUMPHREY   62 HBC

S19R2*     SIGMA+  INTO (NEUTRON PI+ GAM)/(PI+ N)  (10**-4) (P3)/(P2)
S19R2*     ABOUT                    0.4       COURANT    63 HBC

S19R3*     SIGMA+  INTO (LAMBDA E+ NEU)/(PI+ N)    (10**-4) (P4)/(P2)
S19R3*       0.3    APPROX.                   COURANT    64 HBC

S19R4*     SIGMA+  INTO (N MU+/NEU)/(PI+N)         (10**-4) (P6)/(P2)
S19R4*   1 EVENT FOUND,NO BRAN.RAT QUOTED GALTIERI   62 EMUL
S19R4*   0 LESS THAN                2.3       BURNSTEIN  63 HBC

S19R5*     SIGMA+  INTO (N E+ NEU)/(N PI+)  (UNITS 10**-4)  (P7)/(P2)
S19R5*   0 LESS THAN                2.6       BURNSTEIN  63 HBC
S19R5*     LESS THAN                4.0       MURPHY     64 PBC
S19R5*   1 LESS THAN                1.03      NAUENBERG  64 HBC

S19R6*     SIGMA+  INTO (P GAMMA)/(P PIO)        (10**-3)   (P5)/(P1)
S19R6*   1    0.68    OR LESS                 CARRARA    64 HBC
S19R6   24    0.37     0.08                   BAZIN      65 HBC

                          19  SIGMA+ MAGNETIC MOMENT (MAGNETONS,938.26 MEV)

S19MM   24    4.3      1.5                    MCINTURFF  64 EMUL

                          19 SIGMA+ DECAY PARAMETERS

S19A++*    ALPHA SIGMA+   (SIGMA +  INTO PI+ NEUTRON)

S19A++*      -0.03     0.08                   CORK       60 CNTR
S19A++*      -0.20     0.24                   TRIPP      62 HBC

S19A0*     ALPHA SIGMAO (SIG+ INTO PIO PROTON)

S21A0*       -0.90     0.25                   TRIPP      62 HBC
S19A0*       -0.73     0.08      0.09         BEALL      62 CNTR
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                          20  SIGMA-  (1198,JP=1/2+)  I=1

                          20  SIGMA-   MASS (MEV)

S20M       1197.6      0.5                    BARKAS     63 EMUL
S20M   588 1197.0      0.2                    BURNSTEIN  64 HBC

                          20 SIGMA- MASS DIFFER.(-)-(+)(MEV)

S20D 2500     8.25     0.25                   DOSCH      65 HBC

                          20  SIGMA- LIFETIME (UNITS 10**-10)

S20T          1.67     0.40      0.28         BROWN      58 PBC
S20T          1.89     0.33      0.25         EISLER     58 PBC
S20T          1.45     0.12      0.12         CRAWFORD   59 HBC
S20T    45    1.35     0.32      0.17         CHIESA     61 EMUL
S20T    41    1.75     0.39      0.30         BARKAS     61 EMUL

S20T 1208     1.58     0.06      0.06         HUMPHREY   62 HBC

                          20  SIGMA- PARTIAL DECAY MODES

S20P1      SIGMA - INTO  NEUTRON PI-                             S17S 8
S20P2      SIGMA - INTO  NEUTRON PI- GAMMA                       S17S 8S 0
S20P3      SIGMA - INTO  NEUTRON MU- NEUTRINO                    S17S 4S 2
S20P4      SIGMA - INTO  NEUTRON E- NEUTRINO                     S17S 3S 1
S20P5      SIGMA - INTO  LAMBDA E- NEUTRINO                      S18S 3S 1

                          20  SIGMA-  BRANCHING RATIOS

S20R1*     SIGMA - INTO (N MU- NEU)/(N PI-) (UNITS 10**-3)  (P3)/(P1)
S20R1   22    0.66     0.15                   COURANT    64 HBC

S20R2*     SIGMA - INTO (N E- NEU)/(N PI-)  (UNITS 10**-3)  (P4)/(P1)
S20R2    9    1.0      0.4       0.3          MURPHY     64 PBC
S20R2   16    1.37     0.34                   NAUENBERG  64 HBC
S20R2   16    1.15     0.4                    MILLER     64 FBC
S20R2   31    1.4      0.3                    COURANT    64 HBC

S20R3*     SIGMA - INTO (LAMBDA E- NEU)/(N PI-) (UN. 10**-4)(P5)/(P1)
S20R3   11    0.75     0.28                   COURANT    64 HBC

S20R4*     SIGMA - INTO (N PI- GAMMA)/(N PI-) (UN. 10**-4)  (P2)/(P1)
S20R4*     ABOUT                    0.1       COURANT    63 HBC

                          20 SIGMA- DECAY PARAMETERS

S20A-*     ALPHA SIGMA-
S20A-*       -0.16     0.21                   TRIPP      62 HBC
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                          21  SIGMA 0  (1193,JP=1/2+)  I=1

                          21  SIGMA- MASS DIFFER.(-)-(0)(MEV)

S21D1   18    4.75     0.1                    BURNSTEIN  64 HBC
S21D1   37    4.87     0.12                   DOSCH      65 HBC

                          21  SIGMAO LIFETIME (UNITS 10**-14)

S21T *        1.0 OR LESS                     DAVIS      62 EMUL
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REFERENCES FOR TABLES ON STABLE PARTICLES Cont'd.

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IDENTIFIC.  YR AUTHORS                          JOUR.VOL PAGE YR INSTITUTION     COD
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                          19  SIGMA + (1189,JP=1/2+)  I=1

GLASER       58 RVUE D A GLASER +               CERN       270 58 RVUE            S19
EVANS        60 EMUL D EVANS +                  NC     15  873 60 BRISTOL         S19
FREDEN       60 EMUL S C FREDEN +               NC     16  611 60 L R L LIV       S19
KAPLON       60 EMUL M F KAPLON +               ANP     9  139 60 ROCHESTER       S19
CORK         60 CNTR CORK,KERTH,WENZEL +        PR    120 1000 60 L R L           S19
PUSCHEL      60 EMUL W PUSCHEL                  NP     20  254 60 M PLANCK        S19

BARKAS       61 EMUL W H BARKAS +               PR    124 1209 61 L R L           S19
BERTHELOT    61 PBC  A BERTHELOT +              NC     21  693 61 SACLAY          S19
CHIESA       61 EMUL A M CHIESA +               NC     19 1171 61 TORINO          S19
BEALL        62 CNTR BEALL,CORK,KEEFE +         PRL     8   75 62 L R L           S19
GRARD        62 HBC  F GRARD + G A SMITH        PR    127  607 62 L R L           S19
GALTIERI     62 EMUL BARBARO-GALTIERI,BARKAS+PRL        9   26 62 L R L           S19
HUMPHREY     62 HBC  W E HUMPHREY + R R ROSS PR       127 1305 62 L R L           S19
TRIPP        62 HBC  TRIPP,WATSON,FERROLUZZI PRL        9   66 62 L R L           S19

BARKAS       63 EMUL BARKAS,DYER,HECKMAN        PRL    11   26 63 L R L           S19
      ALSO   61 EMUL J DYER                     UCRL      9450 61 L R L           S19
COURANT      63 HBC  H COURANT +                SIENA       15 63 CERN+MARYLAND   S19

BHOWMIK      64 EMUL BHOWMIK,JAIN,MATHUR +      NP     53   22 64 DELHI           S19
BURNSTEIN    64 HBC  R.A.BURNSTEIN +            PRL    13   66 64 MARYLAND        S19
CARRARA      64 HBC  CARRARA,CRESTI +           PL     12   72 64 PADUA           S19
COURANT      64 HBC  COURANT,FILTHUTH +         PR    13681791 64 CERN+HID+MAR+BNLS19
MCINTURFF    64 EMUL MCINTURFF,ROOS             PRL    13  246 64 VANDERBILT      S19
MURPHY       64 PBC  C T MURPHY                 PR    134 B188 64 WISCONSIN       S19
SCHMIDT      64 HBC  SCMIDT,STEINBERGER +       PREPRINT       64 COLUMBIA        S19
BAZIN        65 HBC  BAZIN,BLUMENFELD,CHANG+ PRL       14  154 65 PRINCETON       S19
NAUENBERG    64 HBC  NAUENBERG,SCHMIDT +        PRL    12  679 64 COL+RUTG+PRINC  S19
      ALSO   65 HBC  ALFF,GELFAND,NAUENBERG +PR       13781105 65 COLUMBIA,BNL +  S19

       QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

TRIPP        62 HBC  TRIPP,WATSON,FERROLUZZI PRL        8  175 62 P               S19
ALFF         63 HBC  C ALFF +                   SIENA   1  205 63 COLUM+RUTG+BNL  S19
COURANT      63 HBC  H COURANT +                SIENA   1   73 63 MARYL+CERN+NRL  S19
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Σ^-

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                          20  SIGMA - (1198,JP=1/2+)  I=1

BROWN        58 PBC  J BROWN +                  CERN       270 58 MICHIGAN        S20
EISLER       58 PBC  F EISLER +                 CERN       270 58 COLUMBIA        S20
CRAWFORD     59 HBC  F S CRAWFORD +             PRIV COMM      59 L R L           S20
BARKAS       61 EMUL W H BARKAS +               PR    124 1209 61 L R L           S20
CHIESA       61 EMUL A M CHIESA +               NC     19 1171 61 TORINO          S20

HUMPHREY     62 HBC  W E HUMPHREY + R R ROSS PR       127 1305 62 L R L           S20
TRIPP        62 HBC  TRIPP,WATSON,FERROLUZZI PRL        9   66 62 L R L           S20
BARKAS       63 EMUL W H BARKAS,DYER,HECKMAN PRL       11   26 63 L R L           S20
COURANT      63 HBC  H COURANT +                SIENA       15 63 CERN+MARYLAND   S20

BURNSTEIN    64 HBC  R.A.BURNSTEIN +            PRL    13   66 64 MARYLAND        S20
COURANT      64 HBC  COURANT,FILTHUTH +         PR    13681791 64 CERN+HID+MAR+BNLS20
MILLER       64 FBC  MILLER,STANNARD +          PL     11  262 64 UNL+EP+BERGEN   S20
MURPHY       64 XBC  C.T.MURPHY                 PR    134 B188 64 WISCONSIN       S20
NAUENBERG    64 HBC  U NAUENBERG +              PRL    12  679 64 COL+RUTG+PRIN   S20
                                            AND PRIV COMM MAY 64 COL+RUTG+PRINC  S20
DOSCH        65 HBC  DOSCH,ENGELMANN +          PL     14  239 65 HEIDELBERG      S20
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                          21  SIGMA 0 (1193,JP=1/2+)  I=1

DAVIS        62      D H DAVIS +                PR    127  605 62 EFINS           S21
BURNSTEIN    64 HBC  R.A.BURNSTEIN +            PRL    13   66 64 MARYLAND        S21
DOSCH        65 HBC  DOSCH,ENGELMANN +          PL     14  239 65 HEIDELBERG      S21
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DATA FOR TABLES ON STABLE PARTICLES Concluded

STABLE MEANING IMMUNE TO STRONG DECAY

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CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECH SIGN
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
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                       22  XI-  (1321,JP=1/2 ) I=1/2

                       22  XI-  MASS (MEV)

S22M   12 1320.4      2.2                  UCRL 8030   58 RVUE
S22M   11 1317.0      2.2                  WANG        61 PBC
S22M   18 1317.9      1.9                  FOWLER      61 PBC
S22M    1 1322.0      1.3                  BROWN       62 HBC
S22M      1321.0      0.5                  BERTANZA    62 HBC

S22M   62 1321.1      0.65                 SCHNEIDER   63 HBC
S22M  517 1321.4      0.4                  JANEAU      63 FBC
S22M  505 1320.4      0.3                  LONDON      64 HBC
S22M  241 1321.1      0.3                  BADIER      64 HBC
S22M *    ALL MASSES ABOVE   TO BE RAISED 0.09 MEV BECAUSE LAMBDA RAISED

                       22  XI-  LIFETIME (UNITS 10**-10)

S22T   11     3.5     3.4       1.23       WANG        61 PBC
S22T   18     1.28    0.41      0.25       FOWLER      61 PBC
S22T  517     1.86    0.15      0.14       JAUNEAU     63 FBC
S22T   62     1.55    0.31      0.31       SCHNEIDER   63 HBC
S22T  332     1.80    0.16      0.15       CONNOLLY    63 HBC
S22T  356     1.77    0.12                 CARMONY     64 HBC
S22T  794     1.69    0.07                 HUBBARD     64 HBC

                       22  XI- PARTIAL DECAY MODES

S22P1      XI- INTO LAMBDA PI-                                 S18S 8
S22P2      XI- INTO LAMBDA E- NEUTRINO                         S18S 3S 1
S22P3      XI- INTO NEUTRON PI-                                S17S 8

                       22  XI- BRANCHING RATIOS

S22R1*     XI- INTO (LAMBDA E- NEU)/(LAMBDA PI-)  (10**-3)  (P2)/(P1)
S22R1*  1    1.7    OR LESS                CARMONY +  63 HBC QUOTED BY TICHO

S22R2*     XI- INTO (NEUTRON PI-)/(LAMBDA PI-)    (10**-3)  (P3)/(P1)
S22R2*  0 LESS THAN               5.0      FERRO-LUZZI63 HBC

                       22 XI- DECAY PARAMETER

S22A *     ALPHA XI-

S22A         -0.44    0.11                 JAUNEAU     63 FBC
S22A         -0.49    0.16                 CONNOLLY    63 HBC
S22A    62   -0.73    0.21                 SCHNEIDER   64 HBC
S224   240   -0.5     0.35                 BADIER      64 HBC
S22A   356   -0.62    0.12                 CARMONY     64 HBC
S22A   900   -0.368   0.057                BERGE       65 HBC
S22A *3278   -0.400   0.047                MERRILL     65 HBC

S22B *     BETA XI-

S22B         -0.02    0.22                 CONNOLLY    63 HBC
S22B         -0.24    0.53                 JAUNEAU     63 FBC
S22B    62    0.44    0.36                 SCHNEIDER   64 HBC
S22B   356    0.63    0.16                 CARMONY     64 HBC

S22C *     GAMMA XI-

S22C          0.87    0.10                 CONNOLLY    63 HBC
S22C          0.87    0.05      0.28       JAUNEAU     63 FBC
S22C   356    0.46    0.28                 CARMONY     64 HBC
S22C    62    0.52    0.44                 SCHNEIDER   64 HBC

S22F *     PHI ANGLE (TAN(PHI)=BETA/GAMMA)  (DEGREE)

S22F         -16.     37.                  JAUNEAU     63 FBC
S22F   356    54.0    25.0                 CARMONY     64 HBC
S22F         -1.0     15.0                 CONNOLLY    63 HBC
S22F    62    45.0    30.0                 SCHNEIDER   64 FBC
S22F   900    0.45    10.8                 BERGE       65 HBC
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                       23  XI 0  (1314,JP=1/2 ) I=1/2

                       23  XI       MASS DIFFERENCE (-)-(0)(MEV)

S23D   23     6.8     1.6                  JAUNEAU     63 FBC
S23D   34     6.9     2.2                  LONDON      64 HBC
S23D   45     6.1     1.6                  CARMONY     64 HBC

                       23  XI 0 LIFETIME (UNITS 10**-10)

S23T    1     1.5                          ALVAREZ     59 HBC
S23T   24     3.9     1.4       0.80       JAUNEAU     63 FBC
S23T   45     3.5     1.0        0.8       CARMONY     63 HBC
S23T  101     2.5     0.4        0.3       HUBBARD     63 HBC

                       23  XI 0  PARTIAL DECAY MODES
S23P1      XI 0 INTO LAMBDA PIO                                S18S 9
S23P2      XI 0 INTO PROTON PI-                                S16S 8
S23P3      XI 0 INTO PROTON E- NEU                             S16S 3S 1
S23P4      XI 0 INTO SIGMA+ E- NEU                             S19S 3S 1
S23P5      XI 0 INTO SIGMA- E+ NEU                             S20S 3S 1

                       23  XI 0  BRANCHING RATIOS

S23R1*     XI 0 INTO(PROTON PI-)/(LAMBDA PIO)                  (P2)/(P1)
S23R1*  0 0.027      OR LESS               TICHO       63 HBC

S23R2*     XI 0 INTO(PROTON E- NEU)/(LAMBDA PIO)               (P3)/(P1)
S23R2*  0 0.027      OR LESS               TICHO       63 HBC

S23R3*     XI 0 INTO(SIGMA+ E- NEU)/(LAMBDA PIO)               (P4)/(P1)
S23R3*  0 0.013      OR LESS               TICHO       63 HBC
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                       23  XI 0 DECAY PARAMETER

S23A *     ALPHA XI 0

S23A          -0.51     0.53                  CONNOLLY    63 HBC
S23A          -0.09     0.42                  CARMONY     65 HBC
S23A *106     -0.118    0.161                 BERGE       65 HBC
S23A  553     -0.384    0.13                  MERRILL     65 HBC

S23F *     PHI ANGLE XIO  (TAN(PHI)=BETA/GAMMA)  (DEGREE)

S23F  106     19.8      25.0                  BERGE       65 HBC
S23F *553     -0.2       1.1                  MERRILL     65 HBC
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                      24  OMEGA- (1675,JP=3/2+)   I=0

                      24  OMEGA-  MASS (MEV)
S24   *            QUANTUM NUMBERS ASSIGNED FROM SU3

S24M *  1 1620.0      25.0      10.0     EISENBERG  54 EMUL
S24M    2 1675.0       3.0               BARNES     64 HBC
S24M    1 1673.0       8.0               ABRAMS     64 HBC

                      24  OMEGA - LIFETIME (UNITS 10**-10SEC)

S24T *  1    0.7                         BARNES     64 HBC
S24T    4    1.3       0.7               ABRAMS     64 RVUE INCLUDES ABOVE
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REFERENCES FOR TABLES ON STABLE PARTICLES Concluded


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IDENTIFIC.  YR AUTHORS                        JOUR.VOL PAGE YR INSTITUTION     COD
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                           22  XI -  (1321,JP=1/2)  I=1/2

UCRL8030    58 RVUE W H BARKAS A H ROSENFELDUCRL8030      58 RVUE            S22
FOWLER      61 PBC  W B FOWLER +            PRL    6  134 61 L R L           S22
WANG        61 PBC  K C WANG +              JETP  13  512 61 JINR RUSS       S22

BERTANZA    62 HBC  L BERTANZA +            PRL    9  229 62 BROOKHAV.       S22
BROWN       62 HBC  H N BROWN +             PRL    8  255 62 BROOKHAV        S22
CONNOLLY    63 HBC  P L CONNOLLY +          SIENA      34 63 B N L           S22
                       AND PRIV COMM BY G LONDON APRIL    64 B N L           S22
FERRO-LUZZI 63 HBC  M FERRO-LUZZI +         PR   130 1568 63 L R L           S22

JAUNEAU     63 FBC  L JAUNEAU +             SIENA       4 63 EP+CERN+UC+RU+BES22
      ALSO  63 FBC  L JAUNEAU +             PL     4   49 63 EP+             S22
SCHNEIDER   63 HBC  H SCHNEIDER             PL     4  360 63 CERN            S22
TICHO       63 RVUE H K TICHO               BNL       410 63 RVUE            S22

CARMONY     64 HBC  D D CARMONY +           PRL   12  482 64 UCLA            S22
LONDON      64 HBC  G W LONDON +            BAPS   9   22 64 BNL+SYR         S22
BADIER      64 HBC  J.BADIER +              DUBNA 64      64 EP+SACLAY+AMST  S22
HUBBARD     64 HBC  J.R.HUBBARD +           PR   135 B183 64 LRL             S22
BERGE       65 HBC  P BERGE +               UCRL 11529    65 L R L           S22

         QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

CARMONY     64 HBC  D D CARMONY +           PRL   12  482 64 UCLA,  J        S22
SHAFER      64 HBC  J B SHAFER,     ALVAREZ MEMO 508  MAY 64 L R L, J        S22
MERRILL     65 HBC  DEANE MERRILL           THESIS        65 L R L      J    S22
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                           23  XI 0  (1314,JP=1/2)  I=1/2

ALVAREZ     59 HBC  L W ALVAREZ +           PRL    2  215 59 L R L           S23
JAUNEAU     63 FBC  L JAUNEAU +             SIENA  1    1 63 EP+CERN+UC+RU+BES23
      ALSO  63 FBC  L JAUNEAU +             PL     4   49 63 EP+             S23
TICHO       63 RVUE CARMONY, TICHO +        BNL       410 63 LRL+UCLA        S23

CARMONY     64 HBC  D D CARMONY +           PRL   12  482 64 UCLA            S23
HUBBARD     64 HBC  J.R.HUBBARD +           PR   135 B183 64 LRL             S23
LONDON      64 HBC  G W LONDON +            BAPS   9   22 64 BNL+SYR         S23
BERGE       65 HBC  P BERGE +               UCRL 11529    65 L R L           S23
MERRILL     65 HBC  DEANE MERRILL           THESIS        65 L R L           S23
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                           24  OMEGA - (1675,JP=3/2+)   I=0

EISENBERG   54 EMUL Y EISENBERG             PR    96  541 54 CORNEL          S24
BARNES      64 HBC  V E BARNES +            PRL   12  204 64 B N L           S24
BARNES      64 HBC  BARNES,CONNOLLY +       DUBNA         64 B N L           S24
ABRAMS      64 HBC  ABRAMS,BURNSTEIN +      PRL   13  670 64 MARYLAND+NRLW   S24
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DATA ON MESON RESONANCES

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CODE EVENT QUANTITY  ERROR+     ERROR-     REFERENCE  YR TECH SIGN
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
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                      1  OMEGA (780,JPG=1--)  I=0

                      1  OMEGA  MASS (MEV)

U 1M   400  782.0     1.0                  ALFF        62 HBC
U 1M    64  779.4     1.4                  ARMENTEROS  62 HBC
U 1M * 90   784.0     0.9                  GELFAND     63 HBC
U 1M   650  782.0                          MURRAY      63 HBC
U 1M    34  784.0     1.0                  ARMENTEROS  63 HBC
U 1M   220  781.0     2.0                  KRAEMER     64 DBC
U 1M        785.6     1.2                  MILLER D C  65 HBC

                      1  OMEGA FULL WIDTH (MEV)

U 1W * 90     9.5     2.1                  GELFAND     63 HBC
U 1W   34     9.0     3.0                  ARMENTEROS  63 HBC
U 1W         13.4     2.0                  MILLER D C  65 HBC

                      1  OMEGA PARTIAL DECAY MODES

U 1P1     OMEGA INTO PI+ PI- PIO                               S 8S 8S 9
U 1P2     OMEGA INTO PI+ PI-                                   S 8S 8
U 1P3     OMEGA INTO PI+ PI- GAMMA                             S 8S 8S 0
U 1P4     OMEGA INTO PIO GAMMA                                 S 9S 0
U 1P5     OMEGA INTO 2PIO GAMMA                                S 9S 9S 0
U 1P6     OMEGA INTO MU+ MU-                                   S 4S 4
U 1P7     OMEGA INTO E+ E-                                     S 3S 3
U 1P8     OMEGA INTO ETA GAMMA                                 S14S 0
U 1P9     OMEGA INTO ETA PIO                                   S14S 9

                      1  OMEGA  BRANCHING RATIOS

U 1R1*    OMEGA INTO NEUTRAL/(PI+ PI- PIO) I.E.               (P4+P5)/(P1)
U 1R1        0.10     0.04                 ALFF        62 HBC
U 1R1* 40    0.10     0.03                 MURRAY      63 HBC
U 1R1        0.17     0.04                 ARMENTEROS  63 HBC
U 1R1  20    0.11     0.02                 BUSCHBECK-C63 HBC
U 1R1  35    0.08     0.03                 KRAEMER     64 DBC
U 1R1        0.13     0.035                MILLER D C  65 HBC
U 1R1 348    0.097    0.016                FLATTE      65 HBC

U 1R2*    OMEGA INTO (PI+ PI-)/(PI+ PI- PIO)                  (P2)/(P1)
U 1R2*       0.010 OR LESS                 BUTTON      61 HBC
U 1R2*       0.02 OR LESS                  ALFF        62 HBC
U 1R2*100    0.05  OR GREATER              FICKINGER   63 HBC

U 1R2*       0.07                          ALITTI      63 HBC
U 1R2* 32    0.045    0.016      0.01      MURRAY      63 HBC  NO INTERFERE
U 1R2*       0.05  OR LESS                 ARMENTEROS  63 HBC
U 1R2*       0.02                          JAMES       63 HBC

U 1R2*       0.018    0.012      0.006     WALKER      64 RVUE
U 1R2*       0.005  OR LESS                LUTJENS     64 RVUE NO INTERFERE
U 1R2* 42    0.006 - 0.002 OR GREATER      HUWE        64 HBC  - INTEFERE
U 1R2* 42    0.11 + 0.01 OR LESS           HUWE        64 HBC  + INTERFERE
U 1R2*       0.05   OR LESS                KRAEMER     64 DBC

U 1R2*       0.04   OR GREATER             BATON       65 HBC
U 1R2        0.029    0.011      0.009     FLATTE      65 HBC    COHERENCE
U 1R2        0.082    0.020                FLATTE      65 HBC    INCOHER
U 1R2*       0.035    OR LESS              MILLER D C  65 HBC
U 1R2*       0.01    OR LESS               CLARK          SPRK NO INTERFERE

U 1R3*    OMEGA INTO (PI+PI-PIO)/(PIO GAMMA)                  (P1)/(P4)
U 1R3*       8.0     +-1.5  OR LESS        BARMIN      64 PXBC
U 1R3       10.0      3.0                  BELYAKOV    64 PXBC

U 1R4*    OMEGA INTO (PI+ PI- GAMMA)/(PI+ PI- PIO)            (P3)/(P1)
U 1R4*       0.05   OR LESS                FLATTE      65 HBC

U 1R5*    OMEGA INTO(E+ E-)/(PI+ PI- PIO)  (UNITS 10**-3)  (P7)/(P1)
U 1R5*  3   10.0    OR LESS                MURRAY      63 HBC
U 1R5*       3.9      1.5    OR LESS       BARMIN      63 PBC
U 1R5*  1    2.8    OR LESS                BEZAGUET    64 FBC
U 1R5*       1.4    OR LESS                GALTIERI    65 HBC
U 1R5   0   . 0.1     0.12       0.08      ZDANIS      65 SPRK

U 1R6*    OMEGA INTO (MU+ MU-)/(PI+ PI- PIO)(UNITS 10**-3) (P6)/(P1)
U 1R6*       1.2    OR LESS                GALTIERI    65 HBC
U 1R6*  0    1.0     OR LESS               ZDANIS      65 SPRK

U 1R7*    OMEGA INTO (2PIO GAMM)/(PIO GAMMA)                  (P5)/(P4)
U 1R7*       0.1    OR LESS                BARMIN      64 PXBC

U 1R8*    OMEGA INTO(ETA PIO +ETA GAM)/(PI+PI-PIO)            (P8+P9)/(P1)
U 1R8*       0.017  OR LESS                FLATTE      65 HBC
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                      2  X 0 (960,JPG=0-+) I=0

                      2  X 0 MASS (MEV)

U 2M         950.0                         GOLDBERG 1 64 HBC
U 2M    81   959.0    2.0                  KALBFLEISCH64 HBC
U 2M    89   960.0    5.0                  GOLDBERG 2 64 HBC
U 2M    85   957.0                         DAUBER     64 HBC
U 2M         957.0    3.0                  BADIER     65 HBC

                      2  X 0 WIDTH (MEV)

U 2W * 81   12.0 OR LESS                   KALBFLEISCH64 HBC
U 2W * 89   20.0 OR LESS                   GOLDBERG 2 64 HBC
U 2W * 85    4.0    OR LESS                DAUBER     64 HBC
U 2W *    LESS THAN                30.0    BADIER     65 HBC

                      2  X 0 PARTIAL DECAY MODES

U 2P1     X 0 INTO PI+ PI- ETA                                 S 8S 8S14
U 2P2     X 0 INTO PI+ PI- GAMMA                               S 8S 8S 0
U 2P3     X 0 INTO PIO PIO ETA                                 S 9S 9S14

                      2  X 0 BRANCHING RATIOS

U 2R1*    X 0 INTO (PI+ PI- ETA)/TOTAL                        (P1)/TOTAL
U 2R1 112    0.48     0.05                 KALBFLEISCH64 HBC
U 2R1  72    0.5      0.1                  GOLDBERG   64 HBC

U 2R2*    X 0 INTO (PI+PI- ETA NEUT)/TOTAL
U 2R2  68    0.36     0.05                 KALBFLEISH+64 HBC
U 2R2  28    0.4      0.1                  GOLDBERG 3 64 HBC

U 2R3*    XO INTO (PI+ PI- GAMMA)/TOTAL                       (P2)/TOTAL
U 2R3  42    0.22     0.04                 KALBFLEISH+64 HBC
U 2R3        0.34     0.09                 BADIER     65 HBC

U 2R4*    X 0 INTO (PI+ PI- GAMMA)/(PI PI ETA)                (P2)/(P1+P3)
U 2R4* 24    0.20   APPROX.                GOLDBERG 3 64 HBC
U 2R4        0.25     0.14                 DAUBER     64 HBC

U 2R5*    X 0 INTO (PI+ PI- ETA CHAR.)/TOTAL
U 2R5        0.07     0.04                 BADIER     65 HBC

U 2R6*    X 0 INTO NEUTRALS/TOTAL
U 2R6*       0.24     0.17                 BADIER     65 HBC
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$K_1 K_1$

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                      3  K1 K1 (1020,JPG=EVEN++) I=0
          K1 K1 MAYBE JUST LARGE KK SCATTERING LENGTH

                      3  K1 K1  MASS (MEV)

U 3M * 16 1020.0                           ALEXANDER  62 HBC
U 3M *    1000.0    APPROX                 BINGHAM    62 PBC
U 3M *    1000.0    APPROX                 BIGI       62 HBC
U 3M * 30 1030.0    APPROX.                BALTAY     64 HBC

                      3 K1K1 DECAY MODES AND BRANC. RATIOS SEE TEXT
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REFERENCES ON MESON RESONANCES


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IDENTIFIC.    YR AUTHORS                         JOUR.VOL PAGE YR INSTITUTION     COD
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                      1  OMEGA (780,JPG=1--)  I=0

MAGLIC        61 HBC  B C MAGLIC +               PRL     7  178 61 L R L              U 1
BUTTON        61 HBC  J BUTTON +                 UCRL      9814 61 L R L              U 1
XUONG         61 HBC  N H XUONG +                PRL     7  327 61 I,J,P              U 1
PEVSNER       61 HBC  A PEVSNER +                PRL     7  421 61 HOPKINS+N-WST      U 1

ALFF          62 HBC  C ALFF +                   PRL     9  325 62 COLUMBIA+RUTG      U 1
ARMENTEROS    62 HBC  R ARMENTEROS +             CERN         90 62 CERN+CF+EP        U 1
STEVENSON     62 HBC  M L STEVENSON              PR    125  687 62 I,J,P              U 1

ALITTI        63 HBC  J ALITTI +                 NC     29  515 63 SAC+ORS+BA+BO      U 1
ARMENTEROS    63 HBC  R ARMENTEROS +             SIENA   1  296 63 CERN+CF            U 1
BARMIN        63 PBC  V V BARMIN +               SIENA   1  207 63 ITEP               U 1
BERTHELOT     63 RVUE A BERTHELOT                SIENA   2   60 63 RVUE               U 1
BUSCHBECK-CZ63 HBC    B BUSCHBECK-CZAPP +        SIENA   1  166 63 VIENNA+CERN+AMS    U 1

FICKINGER     63 HBC  FICKINGER,ROBINSON,SALANPRL   10  457 63 B N L              U 1
GELFAND       63 HBC  N GELFAND +                PRL    11  436 63 COLUMBIA+RUTG      U 1
JAMES         63 HBC  JAMES,H L KRAYBILL         PREPRINT       63 YALE               U 1
MURRAY        63 HBC  J J MURRAY +               PL      7  358 63 L R L              U 1
SHAFER        63 HBC  J BUTTON-SHAFER +          STANFORD       63 L R L              U 1

BARMIN        64 PXBC BARMIN,DOLGOLENKO +        JETP   18 1289 64 ITEP               U 1
BELYAKOV      64 PXBC BELYAKOV +                 DUBNA          64 DUBNA+BUCAREST     U 1
BEZAGUET      64 FBC  BEZAGUET,NGUYEN-KHAC +     PL     12   70 64 EP+BERGEN+UCL      U 1
HUWE          64 HBC  D O HUWE                   UCRL     11291 64 L R L              U 1
LUTJENS       64 RVUE G LUTJENS,STEINBERGER      PRL    12  517 64 COLUMBIA           U 1
KRAEMER       64 DBC  KRAEMER,FIELDS,TOOHIG +    PR    136 8496 64 JHU,N-WES,WO COLU 1
WALKER        64 HBC  W D WALKER +               PL      8  208 64 WISCONSIN          U 1
BEZAGUET      64 FBC  BEZAGUET,NGUYEN-KHAC +     PL     12   70 64 EP+BERGEN+UCL      U 1

BATON         65 HBC  BATON,BERTHELOT,DELER +    NC     35  713 65 SAC,ORS,BA,BO      U 1
CLARK         65 SPRK CLARK,CHRISTENSON, +       PREPRINT          PRINCETON          U 1
FLATTE        65 HBC  FLATTE,HUWE,MURRAY +       PRL    14 1095 65 L R L              U 1
GALTIERI      65 HBC  BARBARO-GALTIERI,TRIPP     PRL    14  279 65 L R L              U 1
MILLER D C    65 HBC  D C MILLER                 THESIS NE-131 65 COLUMBIA            U 1
ZDANIS        65 SPRK ZDANIS,MADANSKY,KRAEMER+PRL       14  721 65 JOHNS HOP.+BNL     U 1
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                      2  X 0    (960,JPG=  +)  I=0,1

GOLDBERG 1    64 HBC  M GOLDBERG +               BAPS    9   23 64 BNL+SYR            U 2
KALBFLEISCH   64 HBC  G R KALBFLEISCH +          PRL    12  527 64 L R L              U 2
GOLDBERG 2    64 HBC  M GOLDBERG +               PRL    12  546 64 BNL+SYR            U 2
KALBFLEISCH   64 HBC  G R KALBFLEISCH +          DUBNA          64 L R L              U 2
DAUBER        64 HBC  P. M. DAUBER +             PRL    13  449 64 U C L A            U 2
GOLDBERG 3    64 HBC  GOLDBERG,GUNDZIG +         PRL    13  249 64 SYR +BNL           U 2
KALBFLEISH+   64 HBC  KALBFLEISCH,DAHL +         PRL    13 349A 64 L R L        (JP)  U 2

BADIER        65 HBC  BADIER,DEMOULIN+           PL     17  337 65 EP,SACLAY,AMS      U 2
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$K_1 K_1$

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                      3  K1,K1 (1020,EVEN++) I=0

ALEXANDER     62 HBC  G ALEXANDER +              PRL     9  460 62 L R L              U 3
BIGI          62 HBC  A BIGI +                   CERN        247 62 CERN              U 3
BINGHAM       62 PBC  H H BINGHAM +              CERN        240 62 EP+CERN           U 3
ERWIN         62 HBC  A R ERWIN +                PRL     9   34 62 WISCONSIN          U 3
BALTAY        64 HBC  BALTAY,LACH,SANDWEISS +    DUBNA          64 YALE,BNL           U 3
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DATA ON MESON RESONANCES Cont'd.

CODE EVENT QUANTITY ERROR+ ERROR- REFERENCE YR TECH SIGN IN PEAK

• INDICATES DATA IGNORED BY PROGRAMS

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4 PHI (1020,JPG=1--) I=0

4 PHI MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 4M	34	1019.0	2.0		SCHLEIN	63	HBC	
U 4M	19	1018.6	0.5		GELFAND	63	HBC	
U 4M		1017.0	2.0		ARMENTEROS	63	HBC	
U 4M	85	1020.5	0.5		CONNOLLY 2	63	HBC	

4 PHI WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 4W •	34	5.0 OR LESS			SCHLEIN	63	HBC	
U 4W •	19	3.1	1.0		GELFANC	63	HBC	
U 4W	85	3.1	0.8		CONNOLLY 2	63	HBC	
U 4W		3.4	1.7		ARMENTEROS	63	HBC	
U 4W		3.5	0.1		MILLER D C	65	HBC	

4 PHI PARTIAL DECAY MODES

CODE		SIGN
U 4P1	PHI INTO K+ K-	S10S10
U 4P2	PHI INTO K01 K02	S11S11
U 4P3	PHI INTO RHO PI	U 9S 8
U 4P4	PHI INTO PI+ PI-	S 8S 8
U 4P5	PHI INTO E+ E-	S 3S 3
U 4P6	PHI INTO MU+ MU-	S 4S 4
U 4P7	PHI INTO PIO GAMMA	S 9S 0
U 4P8	PHI INTO ETA GAMMA	S14S 0
U 4P9	PHI INTO PI+PI-GAMMA	S 8S 8S 0
U 4P1 0	PHI INTO OMEGA GAMMA	U 1S 0
U 4P1 1	PHI INTO ETA+PIO	S14S 9
U 4P1 2	PHI INTO PI+ PI- PIO	S 8S 8S 9

4 PHI BRANCHING RATIOS

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 4R1•		PHI INTO (K1 K2)/(K1 K2 AND K+ K-)						(P2)/(P1+P2)
U 4R1	10	0.40	0.10		SCHLEIN	63	HBC	
U 4R1	26	0.41	0.07		LAI	64	HBC	
U 4R2•		PHI INTO (RHO PI)/(K KBAR)						(P3)/(P1+P2)
U 4R2		0.1	0.1		LAI	64	HBC	
U 4R3•		PHI INTO (PI+ PI-)/(K KBAR)						(P4)/(P1+P2)
U 4R3•		0.08 OR LESS			CONNOLLY 2	63	HBC	
U 4R4•		PHI INTO (E+ E-)/(K KBAR)						(P5)/(P1+P2)
U 4R4•		0.0036 OR LESS			GALTIERI	65	HBC	
U 4R5•		PHI INTO (MU+ MU-)/(K KBAR)						(P6)/(P1+P2)
U 4R5•		0.0053 OR LESS			GALTIERI	65	HBC	
U 4R6•		PHI INTO (PI+PI-GAM)/(K KBAR)						(P9)/(P1+P2)
U 4R6•		0.05 OR LESS			LINCSEY 2	65	HBC	
U 4R7•		PHI INTO (OMEGA GAM)/(K KBAR)						(P10)/(P1+P2)
U 4R7•		0.09 OR LESS			LINCSEY 2	65	HBC	
U 4R8•		PHI INTO (ETA+NEUT)/(K KBAR)						(P8+P11)/(P1+P2)
U 4R8•		0.15 OR LESS			LINCSEY 2	65	HBC	
U 4R9•		PHI INTO (K+ K-)/TOTAL						(P1)/TOTAL
U 4R9		0.26	0.06		BAUIER	65	HBC	
U 4R9		0.46	0.04		LINCSEY 1	65	HBC	
U 4R1•0		PHI INTO (K1 K2)/TOTAL						(P2)/TOTAL
U 4R1 0		0.23	0.06		BAUIER	65	HBC	
U 4R1 0		0.37	0.04		LINCSEY 1	65	HBC	
U 4R1•1		PHI INTO (PI+ PI- PIO)/TOTAL						(P12)/TOTAL
U 4R1 1		0.51	0.09		BADIER	65	HBC	
U 4R1•2		PHI INTO (RHO PI)/TOTAL						(P3)/TOTAL
U 4R1 2		0.18	0.08		LINCSEY 1	65	HBC	

f

5 F (1250,JPG=2++) I=0

5 F MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 5M		1250.0	25.0		SELOVE	62	HBC	
U 5M		1260.0	35.0		VEILLET	63	FBC	
U 5M	65	1250.0			GUIRAGOSSIA	63	HBC	
U 5M	85	1260.0			BONDAR	63	HBC	
U 5M		1250.0			LEE	64	HBC	

5 F WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 5W		100.0	25.0		SELOVE	62	HBC	
U 5W •		200. OR LESS			VEILLET	63	FBC	
U 5W	85	160.0			BONDAR	63	HBC	
U 5W		130.0	20.0		LEE	64	HBC	

5 F PARTIAL DECAY MODES

CODE		SIGN
U 5P1	F INTO PI+ PI-	S 8S 8
U 5P2	F INTO 2PI+ 2PI-	S 8S 8S 8S 8
U 5P3	F INTO K KBAR	S12S12

5 F BRANCHING RATIOS

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 5R1•		F INTO (4PI)/(2PI)						(P2)/(P1)
U 5R1		0.08	0.06		BONDAR	63	HBC	
U 5R1•		0.04 OR LESS			CHUNG	65	HBC	
U 5R2•		F INTO (K KBAR)/(PI PI)						(P3)/(P1)
U 5R2•		0.16 OR LESS			WANGLER	64	HBC	
U 5R2•		0.04 OR LESS			CHUNG	65	HBC	

E

6 E MESON (1410,JPG=) I=0,1

6 E MESON MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 6M		1410.0			ARMENTEROS	63	HBC	0
U 6M		1420.0	10.		MILLER D	65	HBC	

6 E MESON WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 6W		60.0			ARMENTEROS	63	HBC	0
U 6W		60.0	10.0		MILLER D	65	HBC	

σ

7 SIGMA MESON (390,JPG=) I=0
EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE
PROBABLY 0(0++)

7 SIGMA MESON MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 7M	173	395.0	10.0		SAMIOS	62	HBC	
U 7M		390.0			KIRZ	63	HBC	
U 7M		379.0	4.0		DEL FABBRO	64	SPRK	
U 7M •		392.0	9.0	VIA ETA	CRAWFORD	64	HBC	BROWN-SINGER MODEL
U 7M •	1800	337.0	4.0	VIA TAU PRIME	KALMUS	64	PBC	BROWN-SINGER MODEL
U 7M •		395.0	17.0	9.0	BROWN	65	RVUE	BROWN-SINGER MODEL

7 SIGMA MESON WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 7W	173	50.0	20.0		SAMIOS	62	HBC	
U 7W		80.0			KIRZ	63	HBC	
U 7W		139.0	13.0		DEL FABBRO	64	SPRK	
U 7W •		88.0	15.0	VIA ETA	CRAWFORD	64	HBC	BROWN-SINGER MODEL
U 7W •	1800	87.0	9.0	VIA TAU PRIME	KALMUS	64	PBC	BROWN-SINGER MODEL
U 7W •		100.0	21.0	17.0	BROWN	65	RVUE	BROWN-SINGER MODEL

D

8 D MESON (1285,JPG=) I=0

IGJP=0+1+,0+2- OR 0+0- SUGGESTED

8 D MESON MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 8M		1280.0	10.0		MILLER D H	65	HBC	
U 8M		1290.0	8.0		D.ANDLAU	65	HBC	

8 D MESON WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U 8W		40.0	10.0		MILLER D H	65	HBC	
U 8W •		25.0	APPROX.		D.ANDLAU	65	HBC	

8 D MESON PARTIAL DECAY MODES

CODE		SIGN
U 8P1	D MESON INTO K KBAR PI	S10S12S 8

f′(1500)

13 F PRIME (1500,JPG=2++) I=0

13 F PRIME(1500) MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U13M		1500.0			BARNES	65	HBC	

13 F PRIME(1500) WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U13W •		80.0	APPROX.		BARNES	65	HBC	

13 F PRIME(1500) PARTIAL DECAY MODES

CODE		SIGN
U13P1	F PRIME(1500) INTO K1 K1	S12S12
U13P2	F PRIME(1500) INTO K K*(890)	S11U18

$S_0(\pi\pi)$

14 S0 (PI PI) (700,JPG=0++) I=0

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

14 S0 (PI PI) (700) MASS (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U14M		700.0			FELDMAN	65	SPRK	
U14M		720.0			HAGOPIAN	65	HBC	

14 S0 (PI PI) (700) WIDTH (MEV)

CODE	EVENT IN PEAK	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U14W		50.0			FELDMAN	65	SPRK	
U14W		50.0			HAGOPIAN	65	HBC	

REFERENCES ON MESON RESONANCES Cont'd.

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4 PHI (1020,JPG=1--) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
BERTANZA	62	HBC	L BERTANZA +	PRL	9	180	62	B N L	U 4
ARMENTEROS	63	HBC	QUOTED BY BERTHELOT	SIENA	2	70	63	CERN+CDF	U 4
CONNOLLY 1	63	HBC	P L CONNOLLY +	PRL	10	371	63	B N L	U 4
CONNOLLY 2	63	HBC	P L CONNOLLY +	SIENA	1	130	63	BNL+SYR	U 4
GELFAND	63	HBC	N GELFAND +	PRL	11	438	63	COLUMBIA+RUTG	U 4
SCHLEIN	63	HBC	P SCHLEIN +	PRL	10	368	63	UCLA	U 4
LAI	64	HBC	K W LAI +	BAPS	9	22	64	BNL+SYR	U 4
GALTIERI	64	HBC	BARBARO-GALTIERI,TRIPP	PRL	14	279	65	L R L	U 4
LINDSEY 2	65	HBC	LINDSEY,SMITH	PRL	15	221	65	L R L	U 4
LINDSEY 1	65	HBC	LINDSEY,SMITH	BAPS	10	502	65	L R L	U 4
BADIER	65	HBC	BADIER,DEMOULIN+	PL	17	337	65	EP,SACLAY,AMS	U 4
MILLER D C	65	HBC	D C MILLER	THESIS NE		131	65	COLUMBIA	U 4

QUANTUM NUMBERS DETERMINATIONS NOT REFERRED TO IN DATA CARDS

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
CONNOLLY	63	HBC	P L CONNOLLY +	SIENA		130	63	BNL+SYR	U 4

f

5 F (1250,JPG=2++) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
SELOVE	62	HBC	W SELOVE +	PRL	9	272	62	PEN+BNL	U 5
BONDAR	63	HBC	L BONDAR +	PL	5	153	63	AACHEN+	U 5
GUIRAGOSSIAN	63	HBC	Z G T GUIRAGOSSIAN	PRL	11	85	63	L R L	U 5
VEILLET	63	FBC	J J VEILLET +	PRL	10	29	63	EP+MILAN	U 5
LEE	64	HBC	Y Y LEE +	PRL	12	342	64	MICHIGAN	U 5
WANGLER	64	HBC	WANGLER	THESIS			64	WISCONSIN	U 5
CHUNG	65	HBC	CHUNG,DAHL,HARDY,HESS	PRL	15	325	65	L R L	U 5

QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
HAGOPIAN	63	HBC	V HAGOPIAN,W SELOVE	PRL	10	533	63	I,J	U 5
ADERHOLZ	64	HBC	M ADERHOLZ +(AACHEN+)	PL	10	240		I	U 5
BRUYANT	64	DBC	BRUYANT,GOLDBERG +	PL	10	232	64	I	U 5
SODICKSON	64	SPCH	L SODICKSON +	PRL	12	485	64	I	U 5

E

6 E MESON (1410,JPG=) I=0,1

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
ARMENTEROS	63	HBC	R ARMENTEROS +	SIENA		267	63	CERN+CDF	U 6
HESS	64	HBC	R I HESS +	DUBNA			64	LRL	U 6
MILLER D	65	HBC	MILLER,CHUNG,DAHL,HESS +	PRL	14	1074	65	L R L	U 6

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7 SIGMA MESON (390,JPG=) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
SAMIOS	62	HBC	N P SAMIUS +	PRL	9	139	62	BNL+CCNY+CO+KY	U 7
KIRZ	63	HBC	KIRZ,SCHWARTZ,TRIPP	PR	130	2481	63	L R L	U 7
CRAWFORD	64	HBC	F S CRAWFORD +	PRL	13	421	64	L R L	U 7
DEL FABBRO	64	SPRK	R DEL FABBRO +	PRL	12	674	64	FRASCATI	U 7
KALMUS	64	PBC	G E KALMUS +	SUBM. PR		JUNE	64	WISCONSIN+LRL	U 7
BROWN	65	RVUE	BROWN,FAIER	CORAL GAB.			65	NORTH-WES	U 7

D

8 D MESON (1285,JPG=) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
MILLER D H	65	HBC	MILLER,DAHL,HARDY,HESS+	PRL	14	1074	65	L R L	U 8

f′(1500)

13 F• (1500,JPG=2++) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
BARNES	65	HBC	BARNES,CULWICK,GUIDONI+	PRL	15	322	65	BNL,SYRACUSE	U13

$S_0(\pi\pi)$

14 S0 (PI PI) (700,JPG=0++) I=0

IDENTIFIC.	YR	TECH	AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
FELDMAN	65	SPRK	FELDMAN,FRATI,HALPERN+	PRL	14	869	65	BNL+COLUM+PENNSI	U14
HAGOPIAN	65	HBC	HAGOPIAN,SELOVE,ALITTI+	PRL	14	1077	65	PENN+SACLAY+BOLO	U14

DATA ON MESON RESONANCES Cont'd.

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CODE EVENT QUANTITY  ERROR+     ERROR-    REFERENCE  YR TECH SIGN
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
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                         9 RHO (750,JPG=1-+)  I=1

                         9 RHO  MASS (MEV)

U 9M  610  770.0        10.0                  ALFF        62 HBC  +
U 9M       783.0         6.0                  JAMES       64 HBC  +
U 9M *     756.0        10.0                  JAMES       64 HBC  +
U 9M * PREV. MASS FOR MOM.TRANS. LESS THAN 2.5 MPI**2
U 9M *     760.0         9.0                  CARMONY     64 HBC  +
U 9M * PREV. MASS FOR MOM TRANSF  LESS THAN 4 MPI**2
U 9M       760.         10.                   ARMENISE    65 HBC  +

U 9M       748.0                              KENNEY      62 HBC   -
U 9M       765.0        10.0                  ERWIN       63 HBC   -
U 9M  130  775.0                              GUIRAGOSSIA63 HBC   -
U 9M       765.0        30.0                  LEE         64 HBC   -

U 9M  290  755.0                              CHADWICK    63 HBC  +-0

U 9M       740.0                              WALKER      62 HBC   -0
U 9M  240  752.0                              ALITTI      63 HBC   -0
U 9M       765.0                              LEE         65 HBC   -0

U 9M  300  750.0        10.0                  ALFF        62 HBC    0
U 9M  190  750.0        20.0                  SAMIOS      62 HBC    0
U 9M  300  760.0        10.0                  ABOLINS     63 HBC    0
U 9M       763.0        10.0                  ERWIN       63 HBC    0
U 9M  160  775.0                              GUIRAGOSSIA63 HBC    0
U 9M  500  770.0        10.0                  GOLDHABER   64 HBC    0
U 9M       765.0        15.0                  LEE         64 HBC    0
U 9M       750.0                              CLARK       65 SPRK   0
U 9M       740.0        10.0                  LANZEROTTI  65 CNTR   0

                         9  RHO  WIDTH (MEV)

U 9W  610  130.0        10.0                  ALFF        62 HBC  +
U 9W        90.0        10.0                  SACLAY      63 HBC  +
U 9W       177.0        15.0                  JAMES       64 HBC  +
U 9W *     146.0        20.0                  JAMES       64 HBC  +
U 9W * PREV.WIDTH FOR MOM.TRANS. LESS THAN 2.5 MPI**2
U 9W *      77.0        20.0                  CARMONY     64 HBC  +
U 9W * PREV.WIDTH FOR MOM TRANSF  LESS THAN 4 MPI**2
U 9W       160.         10.                   ARMENISE    65 HBC  +

U 9W        65.0        20.0                  ERWIN       63 HBC   -
U 9W  130  125.0                              GUIRAGOSSIA63 HBC   -
U 9W   98  180.0                              BONDAR      64 HBC   -

U 9W  290  110.0                              CHADWICK    63 HBC  +-0

U 9W       120.0                              WALKER      62 HBC   -0
U 9W       125.0        15.                   LEE         65 HBC   -0

U 9W  300  100.0        10.0                  ALFF        62 HBC    0
U 9W  190  150.0        20.0                  SAMIOS      62 HBC    0
U 9W  300   90.0        10.0                  ABOLINS     63 HBC    0
U 9W       165.0        20.0                  ERWIN       63 HBC    0
U 9W  160  175.0                              GUIRAGOSSIA63 HBC    0
U 9W   96  210.0                              BONDAR      64 HBC    0
U 9W  500  130.0                              GOLDHABER   64 HBC    0
U 9W       130.0                              CLARK       65 SPRK   0
U 9W       150.0        10.0                  LANZEROTTI  65 CNTR   0

                         9  RHO PARTIAL DECAY MODES

U 9P1      RHO INTO 2PI                                          S 8S 8
U 9P2      RHO INTO 4PI                                          S 8S 8S 8S 8
U 9P3      RHO INTO PI GAMMA                                     S 8S 0
U 9P4      RHO INTO E+ E-                                        S 3S 3

                         9  RHO BRANCHING RATIOS

U 9R1*     RHO INTO 4PI/2PI                                      (P2)/(P1)
U 9R1*        0.05 OR LESS                    XUONG       62 HBC

U 9R2*     RHO INTO PI GAMMA/2PI                                 (P3/P1)
U 9R2*        0.02   OR LESS                  DAUDIN      64 HBC  +

U 9R3*     RHO INTO(E+ E-)/(PI+PI-)           (UN 10**-4)        (P4)/(P1)
U 9R3   0     0.65        0.8        0.4      ZDANIS      65 SPRK
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A1

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                        10  A1 MESON (1200,JPG=  -) I=1

                        10  A1 MESON  MASS (MEV)

U10M       1080.0       20.0                  ALLARD      64 FBC   -
U10M       1080.0       10.0                  HESS        64 HBC   -
U10M       1030.0       20.0                  DEUTSCHMANN64 HBC  +
U10M       1080.0                             ADERHOLZ    64 HBC

                        10  A1 MESON  WIDTH (MEV)

U10W *      100.0     APPROX                  HESS        64 HBC   -
U10W *      150.0     APPROX                  ALLARD      64 FBC   -
U10W         80.0                             ADERHOLZ    64 HBC

                        10  A1 PARTIAL DECAY MODES

U10P1      A1 INTO RHO PI                                       U 9S 8
U10P2      A1 INTO KBAR K                                       S10S11

                        10  A1 BRANCHING RATIOS

U10R1*     A1 INTO (KBAR K)/(RHO PI)                            (P2)/(P1)
U10R1*        0.05   OR LESS                  CHUNG       64 HBC
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B

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                        11  B MESON (1220,JPG=  +) I=1

                        11  B MESON  MASS (MEV)

U11M    60 1220.0                             ABOLINS     63 HBC  +
U11M       1220.0                             HESS        64 HBC   -
U11M       1220.0                             GOLDHABER   65 HBC

                        11  B MESON  WIDTH (MEV)

U11W    60  180.0       20.0                  ABOLINS     63 HBC  +
U11W        180.0       30.0                  HESS        64 HBC   -
U11W         80.0                             GOLDHABER   65 HBC

                        11  B MESON PARTIAL DECAY MODES

U11P1      B MESON INTO OMEGA+PI                                U 1S 8
U11P2      B MESON INTO 2PI+ 2PI-                               S 8S 8S 8S 8
U11P3      B MESON INTO K KBAR                                  S10S10
U11P4      B MESON INTO PI PI                                   S 8S 8

                        11  B MESON  BRANCHING RATIOS

U11R1*     B INTO  4PI/(OMEGA PI)                               (P2)/(P1)
U11R1*        0.5 OR LESS                     ABOLINS     63 HBC  +

U11R2*     B MESON INTO (K KBAR)/(OMEGA PI)                     (P3)/(P1)
U11R2*        0.10    OR LESS                 HESS        64 HBC

U11R2*     B MESON INTO(PI PI)/(PI OMEGA)                       (P4)/(P1)
U11R2*        0.3     OR LESS                 ADERHOLZ    64 HBC
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A2

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                        12  A2 MESON (1310,JPG=2+-)  I=1

                        12  A2 MESON  MASS (MEV)

U12M    70 1310.0                             CHUNG       64 HBC   -
U12M       1320.0                             ADERHOLZ    64 HBC
U12M       1335.0       10.0                  GOLDHABER +64 HBC
U12M       1280.0       20.0                  DEUTSCHMANN64 HBC  +

                        12  A2 MESON  WIDTH (MEV)

U12W    70   80.0                             CHUNG       64 HBC   -
U12W        100.0                             ADERHOLZ    64 HBC
U12W         90.0       10.0                  GOLDHABER +64 HBC

                        12  A2 MESON PARTIAL DECAY MODES

U12P1      A2 MESON INTO RHO PI                                 U 9S 8
U12P2      A2 MESON INTO KBAR K                                 S10S12
U12P3      A2 MESON INTO ETA PI                                 S14S 8
U12P4      A2 INTO XO PI                                        U 2S 8

                        12  A2 MESON  BRANCHING RATIOS

U12R1*     A2 MESON  INTO (K K)/(RHO PI)                        (P2)/(P1)
U12R1*        0.04 OR LESS                    ARMENTEROS 65 HBC   -

U12R2*     A2 MESON INTO (ETA PI)/TOTAL                         (P3)/TOTAL
U12R2         0.00       0.03                 DEUTSCHMANN64 HBC
U12R2         0.3        0.2                  ADERHOLZ    65 HBC
U12R2* 25     0.2      APPROX.                TRILLING    65 HBC
U12R2         0.03       0.03                 CHUNG       65 HBC   -

U12R3*     A2 MESON INTO (RHO PI)/TOTAL                         (P1)/TOTAL
U12R3         0.91       0.04       0.10      CHUNG       65 HBC   -

U12R4*     A2 MESON INTO (XO PI)/TOTAL                          (P4)/TOTAL
U12R4*        0.1 OR LESS                     CHUNG       65 HBC   -

U12R5*     A2 MESON INTO (KBAR K)/TOTAL
U12R5         0.055      0.015                CHUNG       65 HBC   -
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REFERENCES ON MESON RESONANCES Cont'd.

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IDENTIFIC.   YR AUTHORS                       JOUR.VOL PAGE YR INSTITUTION     COD
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                              9 RHO (750,JPG=1-+)  I=1

ANDERSON     61 HBC  J A ANDERSON +           PRL     6  365 61 L R L           U 9
ALFF         62 HBC  C ALFF +                 PRL     9  322 62 COL.+RUTG       U 9
KENNEY       62 HBC  V P KENNEY +             PR    126  736 62 KENTUCKY UN.    U 9
SAMIOS       62 HBC  N P SAMIOS +             PRL     9  139 62 BNL+CCNY+CO+KY  U 9
WALKER       62 HBC  W D WALKER +             CERN         42 62 WISCONSIN      U 9
XUONG        62 HBC  N XUONG,G R LYNCH        PR    128 1849 62 L R L           U 9

ABOLINS      63 HBC  M ABOLINS +              PRL    11  381 63 UCSD            U 9
ALITTI       63 HBC  J ALITTI +               NC     29  515 63 SAC+ORS+BA+BO   U 9
CHADWICK     63 HBC  G B CHADWICK +           PRL    10   62 63 OXFORD + PADOVA U 9
GUIRAGOSSIAN63 HBC   ZGT GUIRAGOSSIAN         PRL    11   85 63 L R L           U 9
ERWIN        63 HBC  ERWIN,SATTERBLOM,WALKER+SIENA       112 63 WISCONSIN       U 9
SACLAY       63 HBC  SACLAY,ORSAY,BARI,BOLOG SIENA       239 63 SAC,ORS,BA,BO   U 9

BATON        64 HBC  BATON,BERTHELOT,DELER + NC     35  713 64 SAC+ORS+BA+BO   U 9
BONDAR       64 HBC  L BONDAR +               NC     31  729 64 AAC,BI,BO,HA,IC+U 9
GOLDHABER    64 HBC  G GOLDHABER +            PRL    12  336 64 L R L           U 9
CARMONY      64 HBC  D D CARMONY +            CUBNA 64        64 UCSD           U 9
DAUDIN       64 HBC  A.DAUDIN +               PREPRINT        64 SACLAY,BARI    U 9
JAMES        64 HBC  F.E.JAMES+ H.L.KRAYBILL DUBNA            64 YALE           U 9
LEE          64 HBC  LEE,ROE,SINCLAIR +       PRL    12  342 64 MICHIGAN        U 9

ARMENISE     65 HBC  ARMENISE,CHIDINI +       NC     37  361 65 SAC+ORS+BARI+BOLU 9
CLARK        65 SPRK CLARK,CHRISTENSON, +     PREPRINT           PRINCETON      U 9
LANZEROTTI   65 CNTR LANZEROTTI,BLUMENTHAL + PRL     15  210 65 HARVARD         U 9
LEE          65 HBC  LEE Y.Y.                 MICH  04938'1 64 MICHIGAN         U 9
ZDANIS       65 SPRK ZDANIS,MADANSKY,KRAEMER+PRL     14  721 65 JOHNS HOP.+BNL  U 9

         EVIDENCE FOR STUCTURE WITHIN THE RHO PEAK IS OBSERVED BY

KEEFE        64 SPRK D. KEEFE +               DUBNA           64 LRL            U 9
JONES        64 SPRK L.W.JONES+               DUBNA           64 MICH,CERN,PRINC+U 9
         SEE ALSO
BUTTON       62 HBC  J BUTTON +               PR    126 1858 62 LRL             U 9
CALDWELL     62 SPRK D O CALDWELL +           PL      2  253 62 CERN            U 9
FOELSCHE     62 HBC  H FOELSCHE +             CERN   62   36 62 YALE            U 9

         QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

ERWIN        61 HBC  A R ERWIN +              PRL     6  628 61  I,J            U 9
PICKUP       61 HBC  E PICKUP +               PRL     7  192 61  J              U 9
STONEHILL    61 HBC  D L STONEHILL +          PRL     6  624 61  I,J            U 9
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A1

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                        10  A1 MESON (1200,JPG=  -) I=1

BELLINI      63 PBC  G BELLINI +              NC     29  896 63 MILAN           U10
HUSON        63 PBC  F R HUSON,W B FRETTER    BAPS    8  325 63 UC BERKELEY     U10

ADERHOLZ     64 HBC  M ADERHOLZ +             PL     10  226 64 AACHEN+         U10
ALLARD       64 FBC  J.F.ALLARD +             PL     12  143 64 EP+CERN+MIL+    U10
CHUNG        64 HBC  S U CHUNG +              PRL    12  621 64 L R L           U10
DEUTSCHMANN 64 HBC   M DEUTSCHMANN +          DUBNA 64        64 AACHEN+BERL+CERNU10
DEUTSCHMANN 64 HBC   M DEUTSCHMANN +          PL     12  356 64 AACHEN+BERL+CERNU10

GOLDHABER    64 HBC  G GOLDHABER +            PRL    12  336 64 L R L           U10
HESS         64 HBC  R.I.HESS +               DUBNA 64        64 LRL            U10
LANDER       64 HBC  R.L.LANDER +             PRL    13 346A 64 UCSD  J,P       U10

ALITTI       65 HBC  ALITTI,BATON,DELER +     PL     15   69 65 SAC(LPC+DSS)+BO U10
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B

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                        11  B MESON (1220,JPG=  +) I=1 .

ABOLINS      63 HBC  M ABOLINS +              PRL    11  381 63 UCSD            U11
BONDAR       63 HBC  L BONDAR +               PL      5  209 63 AACHEN +        U11
CHUNG        63 HBC  SU CHUNG +               SIENA      201 63 L R L           U11
ADERHOLZ     64 HBC  ADERHOLZ +               PL     10  240 64 AA+BI,BO,HA,IC+ U11
HESS         64 HBC  R.I.HESS +               DUBNA 64        64 LRL            U11

GOLDHABER    65 HBC  G GOLDHABER,S GOLDHABER+PRL     15  118 65 L R L           U11

         QUANTUM NUMBERS DETERMINATIONS NOT REFERRED TO IN DATA CARDS

CARMONY      64 HBC  D D CARMONY +            PRL    12  254 64 UCSD J,P        U11
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A2

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                        12  A2 MESON (1310,JPG=2+-)  I=1

ADERHOLZ     64 HBC  M ADERHOLZ +             PL     10  248 64 AACHEN+         U12
CHUNG        64 HBC  S U CHUNG +              PRL    12  621 64 L R L       J,P U12
DEUTSCHMANN 64 HBC   M DEUTSCHMANN +          PL     12  356 64 AACHEN+BERL+CERNU12
DEUTSCHMANN 64 HBC   M DEUTSCHMANN +          DUBNA 64        64 AACHEN+BERL+CERNU12
GOLDHABER    64 HBC  G GOLDHABER +            DUBNA           64 LRL            U12
HESS         64 HBC  R.I.HESS +               DUBNA 64        64 LRL            U12
CHUNG        65 HBC  CHUNG,DAHL,HARDY,HESS    PRL    15  325 65 L R L           U12

         QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

LANDER       64 HBC  R.L.LANDER +             PRL    13 346A 64 UCSD  J,P       U12
ADERHOLZ     65 HBC  ADERHOLZ,BONDAR +        TO BE PUB.      65 AACHEN +       U12
TRILLING     65 HBC  TRILLING,BROWN,GOLDHABERTO BE PUB.       65 L R L          U12
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DATA ON MESON RESONANCES Concluded

CODE EVENT IN PEAK QUANTITY ERROR+ ERROR- REFERENCE YR TECH SIGN

• INDICATES DATA IGNORED BY PROGRAMS

$\pi^+\pi^-(1670)$

15 PI+PI- (1670,JPG=) I=1 OR LESS

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

15 PI+PI-(1670) MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U15M		1670.0	30.0		GOLDBERG	65	HBC	

15 PI+PI-(1670) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U15W		180.0	40.0		GOLDBERG	65	HBC	

$K\bar{K}(1025)$

16 KKBAR (1025,JPG=) I=1

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

16 KKBAR(1025) MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U16M •		1025.0	APPROX.		ARMENTEROS	65	HBC	

16 KKBAR(1025) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U16W •		40.0	APPROX.		ARMENTEROS	65	HBC	

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17 KAPPA (725,J =) I=1/2

17 KAPPA MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U17M		730.0			ALEXANDER	62	HBC	+ 0
U17M	92	726.0	3.0		MILLER	63	HBC	+ 0
U17M	33	723.0	3.0		WOJCICKI	63	HBC	-
U17M		725.0			CONNOLLY	63	HBC	
U17M		725.0	5.0		FERRO-LUZZI	64	HBC	+ 0

17 KAPPA WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U17W •	92	20.0 OR LESS			MILLER	63	HBC	+ 0
U17W •	33	12.0 OR LESS			WOJCICKI	63	HBC	-
U17W •		LESS THAN 30.			FERRU-LUZZI	64	HBC	+ 0

17 KAPPA PARTIAL DECAY MODES

U17P1 KAPPA INTO K PI S10S 8

K^*

18 K* (890,JP =1-) I=1/2

18 K* MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U18M		898.0	5.0		CHADWICK	63	HBC	+
U18M		891.0	3.0		FERRO-LUZZI	65	HBC	+
U18M		890.5			ARMENTEROS	65	HBC	+-
U18M	3870	891.0	1.0		WOJCICKI	63	HBC	-
U18M		891.0	3.0		GELSEMA	64	HBC	-
U18M	200	880.0			ALEXANDER	62	HBC	+ 0
U18M		885.0			ARMENTEROS	62	HBC	+-0
U18M	70	897.0	10.0		COLLEY	62	HBC	0
U18M	200	892.0	2.0		KRAEMER	63	HBC	0
U18M	150	885.0			SMITH	63	HBC	0

18 K* WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U18W		46.0	8.0		CHADWICK	63	HBC	+
U18W		47.0	4.0		FERRO-LUZZI	65	HBC	+
U18W	3870	46.0	3.0		WOJCICKI	63	HBC	-
U18W		50.0	13.0		GELSEMA	64	HBC	-
U18W		31.0			ARMENTERUS	65	HBC	+-
U18W	200	60.0	5.0		ALEXANDER	62	HBC	+ 0
U18W		55.0			ARMENTERUS	62	HBC	+-0
U18W	70	60.0	10:0		COLLEY	62	HBC	0
U18W	150	50.0			SMITH	63	HBC	0
U18W	200	50.0	5.0		KRAEMER	63	HBC	0

18 K* PARTIAL DECAY MODES

U18P1 K* INTO K PI S10S 8
U18P2 K* INTO K2PI S10S 8S 8
U18P3 K* INTO KAPPA PI U17S 8

18 K* BRANCHING RATIOS

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U18R1•		K* INTO (KAPPA PI)/(K PI)						(P3)/(P1)
U18R1•	3	0.005 OR LESS			GOLDHABER	63	HBC	-
U18R1•	0	0.002 OR LESS			WOJCICKI+	63	HBC	-
U18R1•		LESS THAN 0.01			FERRO-LUZZI	64	HBC	+ 0
U18R2•		K* INTO (K 2PI)/(K PI)						(P2)/(P1)
U18R2•	0	0.002 OR LESS			WOJCICKI+	63	HBC	-

$K\pi\pi$

19 K2PI (1175,JP=) I=

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

19 K2PI MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN	
U19M •	23	1175.0			WANGLER	64	HBC		
U19M	15	1160.0	10.0		MILLER	65	HBC		PURDUE

19 K2PI WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN	
U19W •	23	25.0 OR LESS			WANGLER	64	HBC		
U19D	15	35.0	10.0		MILLER	65	HBC		PURDUE

C

20 C MESON (1215,JP=) I=

20 C MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U20M		1215.0	15.0		ARMENTEROS	64	HBC	

20 C WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U20W		60.0	10.0		ARMENTEROS	64	HBC	

20 C PARTIAL DECAY MODES

U20P1 C INTO K+- RHO-+ S10U 9
U20P2 C INTO KO RHO0 S11U 9
U20P3 C INTO K*+- PI-+ U18S 8
U20P4 C INTO K*0 PI0 U18S 9
U20P5 C INTO K PI PI S11S 8S 8

20 C BRANCHING RATIOS

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U20R1•		C INTO (K+- RHO-+)/(K0 RHO0)						P1/P2
U20R1•		ABOUT 0.82			ARMENTEROS	64	HBC	0
U20R2•		C INTO (K*0 PI0)/(K*+- PI-+)						P3/P4
U20R2•		ABOUT 0.9			ARMENTEROS	64	HBC	0

$K^*_{3/2}(1270)$

21 K PI PI (1270,JP=) I=3/2

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

21 K PI PI MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U21M		1270.0	20.0		BOCK	64	HBC	

21 K PI PI WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U21W		60.0	30.0		BOCK	64	HBC	

21 K PI PI PARTIAL DECAY MODES

U21P1 K PI PI INTO K* PI U18S 8
U21P2 K PI PI INTO K RHO S10U 9

$K^*(1400)$

22 K* (1400,JP=) I=1/2

22 K*(1400) MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U22M	21	1400.0	10.0		HAQUE	65	HBC	
U22M	36	1430.0	20.0		HARDY	65	HBC	
U22M		1404.0	15.0		FOCARDI	65	HBC	

22 K*(1400) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U22W	21	160.0			HAQUE	65	HBC	
U22W	36	100.0	20.0		HARDY	65	HBC	
U22W		92.0	14.0		FOCARDI	65	HBC	

22 K* (1400) PARTIAL DECAY MODES

U22P1 K*(1400) INTO K PI S10S 8

$K\pi\pi(1320)$

23 K2PI (1320,JPG=) I=1/2

23 K2PI(1320) MASS (MEV)

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U23M		1320.0	25.0		ALMEIDA	65	HBC	

23 K2PI(1320) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U23W		60.0	20.0		ALMEIDA	65	HBC	

23 K2PI(1320) PARTIAL DECAY MODES

U23P1 K2PI(1320) INTO K*(890)+PI U18S 8

$K^+K^+(1055)$

60 K+K+ (1055,JPG=) I=1 S=2

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

60 K+K+(1055) MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U60M		1055.0	20.0		FERRO-LUZZI	65	HBC	

60 K+K+(1055) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U60W		60.0	25.0		FERRO-LUZZI	65	HBC	

$K^+K^+(1280)$

61 K+K+ (1280,JPG=) I=1 S=2

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

61 K+K+(1280) MASS (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U61M		1280.0	20.0		FERRO-LUZZI	65	HBC	

61 K+K+(1280) WIDTH (MEV)

CODE	EVENT	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECH	SIGN
U61W		110.0	40.0		FERRO-LUZZI	65	HBC	

REFERENCES ON MESON RESONANCES Concluded

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
$\pi^+\pi^-(1670)$ 15 PI+PI-(1670,JPG=) I=0,1									
GOLDBERG	65	HBC	GOLDBERG,JUDD,VEGNI+	PL	17	354	65	CERN+SAC+ORS+MILU	15
$K\bar{K}(1025)$ 16 KKBAR(1025,JPG=) I=1									
ARMENTERUS	65	HBC	ARMENTEROS,EDWARDS+	PL	17	344	65	CERN+PARIS	U16
κ 17 KAPPA (725,JP =) I=1/2									
ALEXANDER	62	HBC	G ALEXANDER +	PRL	8	447	62	L R L	U17
CONNOLLY	63	HBC	P L CONNOLLY +	SIENA		125	63	BNL+SYR	U17
MILLER	63	HBC	D H MILLER +	→PL	5	279	63	L R L	U17
WOJCICKI	63	HBC	S G WOJCICKI +	PL	5	283	63	L R L	U17
FERRO-LUZZI	64	HBC	M.FERRO-LUZZI +	PL	12	255	64	CERN	U17
K^* 18 K* (890,JP =1-) I=1/2									
ALSTON	61	HBC	M H ALSTON +	PRL	6	300	61	L R L	U18
ALEXANDER	62	HBC	G ALEXANDER +	PRL	8	447	62	L R L	U18
ARMENTEROS	62	HBC	R ARMENTEROS +	CERN		229	62	CERN+CDF+EP	U18
COLLEY	62	HBC	D COLLEY +	CERN		315	62	COLUMBIA+RUTG	U18
CHADWICK	63	HBC	G B CHADWICK +	PL	6	309	63	OXFORD+PADOVA	U18
GOLDHABER	63	HBC	S GOLDHABER	ATHENS		92	63	L R L	U18
KRAEMER	63	HBC	R KRAEMER +	ATHENS		130	63	JOHNS HOPK.	U18
SMITH	63	HBC	G A SMITH +	PRL	10	138	63	L R L	U18
FERRO-LUZZI	64	HBC	M.FERRO-LUZZI +	PL	12	255	64	CERN	U18
GELSEMA	64	HBC	E.S.GELSEMA +	PL	10	341	64	AMSTERDAM	U18
WOJCICKI +	64	HBC	S.G.WOJCICKI +	PR	135	B495	64	LRL	U18
WOJCICKI	64	HBC	S.G.WOJCICKI	PR	135	B484	64	LRL	U18
ARMENTEROS	65	HBC	ARMENTEROS,EDWARDS+	PL	17	170	65	CERN,PARIS	U18
FERRO-LUZZI	65	HBC	FERRO-LUZZI,GEORGE+	NC	36	1101	65	CERN	U18
QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS									
CHINOWSKY	62	HBC	W CHINOWSKY +	PRL	9	330	62	J	U18
$K\pi\pi$ 19 K2PI (1175,JP=) I=									
WANGLER	64	HBC	TP WANGLER,WALKER,ERWIN	PL	9	71	64	WISCONSIN	U19
MILLER	65	HBC	MILLER,KOVACS,MCILWAIN+	PL	15	74	65	PURDUE	U19
C 20 C MESON(1200,JP=) I=1/2									
ARMENTEROS	64	HBC	R ARMENTEROS +	PL	9	207	64	CERN+CDF	U20
ARMENTEROS	64	HBC	R ARMENTEROS +	DUBNA 64			64	CERN+CDF	U20
$K^*_{3/2}(1270)$ 21 K PI PI (1270,JP=) I=3/2									
BOCK	64	HBC	R BOCK +	PL	12	65	64	CERN+EP+IMP.COLL	U21
$K^*(1400)$ 22 K* (1400,JP=) I=1/2									
HAQUE	65	HBC	HAQUE,SCOTTER +	PL	14	338	65	BI+ICL+OXF+RUTH	U22
HARDY	65	HBC	HARDY,CHUNG,DAHL,HESS +	PRL	14	401	65	L R L	U22
FOCARDI	65	HBC	FOCARDI,MINGUZZI'RANZI+	PL	16	351	65	BOL+MODENA+SACL	U22
$K\pi\pi(1320)$ 23 K2PI(1320) (1320,JPG=) I=1/2									
ALMEIDA	65	HBC	ALMEIDA,ATHERTON,BYER+	PL	16	184	65	CAVENDISH	U23
$K^+K^+(1055)$ 60 K+K+ (1055,JPG=) I=1 S=2									
FERRO-LUZZI	65	HBC	FERRO-LUZZI,GEORGE+	PL	17	155	65	CERN	U60
$K^+K^+(1280)$ 61 K+K+ (1280,JPG=) I=1 S=2									
FERRO-LUZZI	65	HBC	FERRO-LUZZI,GEORGE+	PL	17	155	65	CERN	U61

DATA ON BARYON RESONANCES

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CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECHNIQUE.
    IN PEAK

   • INDICATES DATA IGNORED BY PROGRAMS
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$N^*_{1/2}(1480)$

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                     24  N*1/2 (1480,JP=1/2+)   I=1/2
U24   •          EXISTENCE DUBIOUS

                     24  N*1/2(1480) MASS (MEV)

U24M •     1400.0   APPROX                 COCCONI     64 CNTR
U24M •     1415.0   APPROX                 BAREYRE     64 RVUE
U24M       1497.                           ROPER       64 RVUE
U24M •     1425.0    APPROX                ADELMAN     64 HBC   +
U24M       1512.0                          AUVIL       64 RVUE
U24M       1425.0      14.0                ADELMAN     65 RVUE

                     24  N*1/2(1480) WIDTH (MEV)

U24W        240.0                          BAREYRE     64 RVUE
U24W        260.                           AUVIL       64 RVUE
U24W         58.0                          ADELMAN     65 RVUE
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N*(1512)

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                     25  N*1/2 (1512,JP=3/2-)   I=1/2
                      PARITY ASSIGNMENT STILL NOT FINAL

                     25  N*1/2(1512)  MASS (MEV)

U25M       1512.0                          PEIERLS     60 RVUE
U25M       1512.0                          FALK-VARIAN61 RVUE
U25M       1512.0                          MOYER       61 RVUE
U25M       1515.0                          DETOEUF     61 RVUE
U25M       1518.0      10.0                BELLETTINI  63 CNTR
U25M       1534.                           ROPER       64 RVUE

U25M       1525.0                          AUVIL       64 RVUE
U25M       1519.0       5.0                DEVLIN      65 CNTR

                     25  N*1/2(1512)  WIDTH (MEV)

U25W        140.0                          FALK-VARIAN61 RVUE
U25W        125.0      12.5                DETOEUF     61 RVUE
U25W •       80.0    APPROX                BELLETTINI  63 CNTR
U25W         56.                           AUVIL       64 RVUE
U25W •       61.0       5.0 LOWER HALF     DEVLIN      65 CNTR
U25W •       52.0       3.0 UPPER HALF     DEVLIN      65 CNTR

                     25  N*1/2(1512) PARTIAL DECAY MODES

U25P1      N*1/2(1512) INTO N PI                                  S16S 8
U25P2      N*1/2(1512) INTO N PI PI                               S16S 8S 8
U25P3      N*1/2(1512) INTO  ETA N                                S14S17
U25P4      N*1/2(1512) INTO N*3/2(1238)+PI                        U31S08

                     25  N*1/2(1512) BRANCHING RATIOS

U25R1•     N*1/2(1512) INTO (N PI)/TOTAL                         (P1)/TOTAL
U25R1        0.79                          OMNES       61 RVUE
U25R1        0.62                          DEVLIN      62 CNTR
U25R1        0.67                          LAYSON      63 RVUE
U25R1        0.71      0.08                DETOEUF     64 CNRT
U25R1        0.77      0.02                AUVIL       64 RVUE
U25R1        0.80                          DEVLIN      65 CNTR

U25R2•     N*1/2(1512) INTO (ETA PI)/TOTAL                       (P3)/TOTAL
U25R2•       SEEN ,NO RATIO QUOTED         BULOS       64 SPRK

U25R3•     N*1/2(1512) INTO(N*3/2(1238)+PI)/TOTAL                (P4)/TOTAL
U25R3•       SEEN ,NO RATIO QUOTED         KIRZ        63 HBC
U25R3•       SEEN ,NO RATIO QUOTED         CROUCH      65 HBC
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N*(1688

```
                     26  N*1/2  (1688,JP=5/2+) I=1/2
           PARITY ASSIGNMENT STILL NOT FINAL
                     26  N*1/2(1688)  MASS (MEV)

S26M       1715.0                          PEIERLS     60 RVUE
U26M       1683.0                          FALK-VAIRAN61 RVUE
U26M       1688.0                          MOYER       61 RVUE
U26M       1699.4                          AUVIL       64 RVUE
U26M       1673.0       6.0                DEVLIN      65 CNTR

                     26  N*1/2(1688)  WIDTH (MEV)

U26W        120.0                          FALK-VAIRAN61 RVUE
U26W        170.0      20.0      10.0      OMNES       61 RVUE
U26W •       49.0   LOWER  HALF WIDTH      AUVIL       64 RVUE
U26W •       48.0   HIGHER HALF WIDTH      AUVIL       64 RVUE
U26W •       43.0       3.0 LOWER HALF     DEVLIN      65 CNTR
U26W •       73.0       3.0 UPPER HALF     DEVLIN      65 CNTR

                     26  N*1/2(1688) DECAY MODES
U26P1      N*1/2(1688) INTO N PI                                  S16S 8
U26P2      N*1/2(1688) INTO N PI PI                               S16S 8S 8
U26P3      N*1/2(1688) INTO LAMBDA K                              S18S11
U26P4      N*1/2(1688) INTO ETA PROTON                            S14S16
U26P5      N*1/2(1688) INTO  N*1/2(1238)+PI                       U31S08

                     26  N*1/2(1688) BRANCHING RATIOS

U26R1•     N*1/2(1688) INTO (N PI)/TOTAL                         (P1)/TOTAL
U26R1        0.91      0.10      0.13      OMNES       61 RVUE
U26R1        0.88                          LAYSON      63 RVUE
U26R1        0.82                          AUVIL       64 RVUE
U26R1        0.90                          DEVLIN      65 CNTR

U26R2•     N*1/2(1688) INTO(N ETA)/TOTAL                         (P4)/TOTAL
U26R2•       0.02   OR LESS                KRAEMER +   64 HBC

U26R3•     N*1/2(1688) INTO (N*1/2(1238)+PI)/TOTAL               (P5)/TOTAL
U26R3•       SEEN ,NO RATIO QUOTED         CROUCH      65 HBC
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N*(2190)

```
                     27  N*1/2   (2190,JP=7/2-)   I=1/2
              SPIN,PARITY ASSIGNMENT NOT FINAL

                     27  N*1/2(2190)  MASS (MEV)

U27M       2190.0                          DIDDENS     63 CNTR
U27M       2210.                           HOHLER      64 RVUE

                     27  N*1/2(2190)  WIDTH (MEV)

U27W        200.0                          DIDDENS     63 CNTR

                     27  N*1/2(2190) PARTIAL DECAY MODES
U27P1      N*1/2(2190) INTO N PI                                  S16S 8
U27P2      N*1/2(2190) INTO LAMBDA K                              S18S11

U27P1•     PI P FRACTION BASED ON GUESS THAT J=7/2
U27P2•     SOME LAMBDA K MODE REPORTED BY  SCHWARTZ 64
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N*(2650)

```
                     28  N*1/2 (2650,JP=9/2+) I=1/2
            SPIN,PARITY ASSIGNMENT NOT FINAL

                     28 .N*1/2(2650) MASS (MEV)

U28M       2700.0                          R ALVAREZ   64 CNTR
U28M       2660.                           HOHLER      64 RVUE
U28M       2645.0      10.0                CITRON      64 CNTR
U28M •     2600.0    APPROX                WAHLIG      64 SPRK   0

                     28  N*1/2(2650) WIDTH (MEV)

U28W        100.0                          R ALVAREZ   64 CNTR
U28W        230.0                          CITRON      64 CNTR

                     28  N*1/2(2650) PARTIAL DECAY MODES

U28P1      N*1/2(2700) INTO N ETA                                 S16S14
U28P2      N*1/2(2700) INTO N PI                                  S16S 8

                     28  N*1/2(2650) BRANCHING RATIOS

U28R1•     N*1/2(2700) INTO (N PI)/TOTAL                         (P2)/TOTAL
U28R1•       0.06   OR LESS                R ALVARIZ   64 CNTR
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REFERENCES ON BARYON RESONANCES


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IDENTIFIC.  YR AUTHORS                        JOUR.VOL PAGE YR INSTITUTION     COD
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N(1480)

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                     24  N*1/2 (1480,JP=1/2+)  I=1/2

BAREYRE      64 RVUE P BAREYRE +              PL      8  137 64 SACLAY+CAEN      U24
COCCONI      64 CNTR G COCCONI +              PL      8  134 64 CERN             U24
ROPER        64 RVUE L D ROPER                PRL    12  340 64 LRL-LIVERMORE    U24
ROPER        64 RVUE L.D.ROPER + R.M.WRIGHT   UCRL      7846 64 LRL-LIVERMORE    U24
ADELMAN      64 HBC  S.L.ADELMAN              PRL    13  555 64 CAMBRIDGE        U24
AUVIL        64 RVUE P.AUVIL +                PL     12   76 64 IC+UC LONDON     U24
ADELMAN      65 RVUE ADELMAN S L              PRL    14 1043 65 CAVENDISH        U24

       FOR ARGUMENTS AGAINST RESONANT BEHAVIOUR SEE                              U24

BRANDSDEN    64 RVUE B.H.BRANDSDEN +          PL     11  339 64 DURHAM+RUTHERFRDU24
DALITZ       64 RVUE R.H.DALITZ+R.G.MOORHOUSE PL     14  159 65 OXFORD RUTHERFRDU24
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N (1512)

```
                     25  N*1/2 (1512,JP=3/2-)  I=1/2

PEIERLS      60 RVUE R F PEIERLS              PR    118  325 60 RVUE             U25
DETOEUF      61 RVUE J F DETOEUF              AIX     2   57 61 RVUE             U25
FALK-VARIANT61 RVUE FALK-VARIANT,VALLADAS     RMP    33  362 61 RVUE             U25
MOYER        61 RVUE B J MOYER                RMP    33  367 61 RVUE             U25
OMNES        61 RVUE R OMNES,G VALLADAS       AIX     1  467 61 RVUE             U25

DEVLIN       62 CNTR DEVLIN,MOYER,PEREZMENDEZPR     125  690 62 CNTR             U25
BELLETTINI   63 CNTR G BELLETTINI +           NC     29 1195 63 PISA+FIR+WCL     U25
KIRZ         63 HBC  KIRZ,SCHWARTZ,TRIPP      PR    130 2481 63 L R L            U25
LAYSON       63 RVUE W M LAYSON               NC     27  724 63 RVUE             U25

AUVIL        64 RVUE P AUVIL,C LOVELACE       NC     33  473 64 IMPER.COLLEGE    U25
BULOS        64 SPRK BULOS,LANOU,PIFER +      PRL    13  486 64 BRO+BRA+HA+MI+PAU25
DETOEUF      64 CNTR J F DETOEUF +            PL      8   74 64 SACLAY           U25
DEVLIN       65 CNTR DEVLIN, SOLOMON,BERTSCH PRL     14 1031 65 PRINCETON        U25
CROUCH       65 HBC  CROUCH,HARGRAVES +       DESY CONF.     65 BRO+CEA+HA+MI+PAU25

        QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

CENCE        63 CNTR R CENCE,MOYER +          STANFORD       63 J P              U25
AUVIL        64 RVUE P AUVIL,C LOVELACE       NC     33  473 64 IMPER.COLLEGE    U25
ROPER        64 RVUE L.D.ROPER + R.M.WRIGHT   UCRL      7846 64 LRL-LIVERMORE    U25
ROPER        64 RVUE L D ROPER                PRL    12  340 64 J P              U25
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N (1688)

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                     26  N*1/2  (1688,JP=5/2+)  I=1/2

PEIERLS      60 RVUE R F PEIERLS              PR    118  325 60 RVUE             U26
FALK-VARIANT61 RVUE FALK-VARIANT,VALLADAS     RMP    33  362 61 RVUE             U26
MOYER        61 RVUE B J MOYER                RMP    33  367 61 RVUE             U26
OMNES        61 RVUE R OMNES,G VALLADAS       AIX     1  467 61 RVUE             U26

LAYSON       63 RVUE W M LAYSON               NC     27  724 63 RVUE             U26
KRAEMER      64 HBC  R KRAEMER +              PR    136 B496 64 HOPKINS+NW+WDSTKU26

CROUCH       65 HBC  CROUCH,HARGRAVES +       DESY CONF.     65 BRO+CEA+HA+MI+PAU26
DEVLIN       65 CNTR DEVLIN, SOLOMON,BERTSCH PRL     14 1031 65 PRINCETON        U26

        QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS              U26

DETOEUF      61 RVUE J F DETOEUF              AIX     2   57 61 J                U26
CENCE        63 CNTR R CENCE,MOYER +          STANFORD       63 J P              U26
HELLAND      63 SPRK J A HELLAND +            PRL    10   27 63 J                U26
AUVIL        64 RVUE P AUVIL,C LOVELACE       NC     33  473 64 IMPER.COLLEGE    U26
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N(2190)

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                     27  N*1/2  (2190,JP=7/2-)  I=1/2
          SPIN,PARITY ASSIGNMENT NOT FINAL

DIDDENS      63 CNTR A N DIDDENS +            PRL    10  262 63 B N L            U27
SCHWARTZ     64 HBC  J SCHWARTZ +             BAPS    9  420 64 L R L            U27
HOHLER       64 RVUE G.HOHLER + J.GIESECKE    PL     12  149 64 KARLSRUHE        U27

        QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS               U27

DONNACHIE    64 RVUE DONNACHIE+HAMILTON       ANP    31  410 65 UCL , J,P        U27
             PREVIOUS ASSIGNMENT BASED ON DISPERSION RELATION CALCULAT.          U27
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N(2650)

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                     28  N*1/2(2650,JP=9/2+)  I=1/2
          SPIN,PARITY ASSIGNMENT NOT FINAL

R ALVAREZ    64 CNTR R ALVAREZ +              PRL    12  710 64 MIT+CEA          U28
CITRON       64 CNTR A CITRON +               PRL    13  205 64 BNL              U28
HOHLER       64 RVUE G.HOHLER + J.GIESECKE    PL     12  149 64 KARLSRUHE        U28
WAHLIG       64 SPRK M.A.WAHLIG               PRL    13  103 64 MIT              U28

        QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS               U28

DONNACHIE    64 RVUE DONNACHIE+HAMILTON       ANP    31  410 65 UCL , J,P        U28
             PREVIOUS ASSIGNMENT BASED ON DISPERSION RELATION CALCULAT.          U28
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TABLES FROM UCRL-8030(rev.) March 1965

Table S – Stable particles

		$I(J^{PG})C$	Mass (MeV)	Mass difference (MeV)	Mean life (sec)	$Mass^2$ $(BeV)^2$	Magnetic moment $(e/2m_p)$	Partial mode	Fraction	Q (MeV)	p or p_{max} (MeV/c)
LEPTONS	γ	$J^P=1^-C^-$			stable	0		stable			
	ν_e ν_μ	J=1/2	0(<0.2 keV) 0(<2.5 MeV)		stable	0 0		stable			
	$e^\mp$	J=1/2	0.511006 ±0.000002		stable	0.000	1.0011609 † ±.0000024	stable			
	$\mu^\mp$	J=1/2	105.659 ±0.002	-33.95 ±0.05	2.2001×10^{-6} ±.0008 Xscale=2.5	0.011	1.001162 ±.000005 in $e/2m_\mu$	$e\nu\bar{\nu}$	100%	105.15	52.8
MESONS	$\pi^\pm$	$1(0^{--})C_n^+$	139.580 ±0.015		2.551×10^{-8} ±.026	0.019		$\mu\nu$ $e\nu$ $\mu\nu\gamma$ $\pi^0 e\nu$	100% $(1.24\pm.03)10^{-4}$ $(1.24\pm.25)10^{-4}$ $(1.11\pm.08)10^{-8}$	33.92 139.07 33.92 4.09	29.80 69.80 29.80 4.50
	π^0		134.974 ±0.015	4.6056 ±0.0055	1.78×10^{-16} ±.26 Xscale=1.3	0.018		$\gamma\gamma$ γe^+e^-	98.8 (1.19±.05)%	135.00 133.95	67.50 67.49
	$K^\pm$	1/2(0⁻)	493.78 ±0.17	-3.90 ±0.25	1.229×10^{-8} ±.008	0.244		$\mu\nu$ $\pi^\pm\pi^0$ $\pi^\pm\pi^-\pi^+$ For other decays see Table S–Decay	(63.2±.4)% (21.3±.4)% (5.5±.1)% Xscale = 1.4	388.1 219.2 75.0	235.6 205.2 125.5
	K^0		497.7 ±0.30		50%K1, 50%K2						
	K_1			$-0.91\times1/\tau_1$ ±0.07 Xscale=2.3	0.881×10^{-10} ±.010 Xscale=1.4	0.248		$\pi^+\pi^-$ $\pi^0\pi^0$	(68.5±1.0)% (31.5±1.0)%	218.5 227.8	206.0 209.1
	K_2				5.77×10^{-8} ±.59	0.248		$\pi^0\pi^0\pi^0$ $\pi^+\pi^-\pi^0$ $\pi\mu\nu$ $\pi e\nu$ $\pi^+\pi^-$	(24.8±3.0)% (13.6±1.0)% (26.2±2.6)% (35.4±2.7)% $(2.1\pm0.3)\times10^{-3}$	92.8 83.6 252.5 357.6 218.5	139.3 132.8 216.0 229.3 206.0
	η	$0(0^{-+})C^+$	548.8 ±0.5		Γ < 10 MeV	0.301		$\gamma\gamma$ $3\pi^0$ or $\pi^0 2\gamma$ $\pi^+\pi^-\pi^0$ $\pi^+\pi^-\gamma$ $\pi^0e^+e^-$	(38.6±2.7)% (30.8±2.3)% (25.0±1.6)% (5.5±1.2)% <(1.1±1.1)% Xscale=1.4	548.7 143.8 134.8 269.5 412.7	274.3 179.5 174.4 236.2 257.7
BARYONS	p	1/2(1/2⁺)	938.256 ±0.005	-1.2933 ±0.0001	stable	0.880	2.792816 ±.000034				
	n		939.550 ±0.005		1.01×10^3 ±.03	0.882	-1.913148 ±.000066	$pe^-\nu$	100%	0.78	1.19
	Λ	0(1/2⁺)	1115.44 ±0.12 Xscale=1.2		2.61×10^{-10} ±.02 Xscale=1.5	1.242	-0.73 ±0.17	$p\pi^-$ $n\pi^0$ For other decays see Table S–Decay	(66.3±1.0)% (33.6±1.0)% Xscale=1.3	37.6 40.9	100.2 103.7
	Σ^+	1(1/2⁺)	1189.39 ±0.14	7.90 ±0.09	0.794×10^{-10} ±.026	1.415	4.3±1.5	$p\pi^0$ $n\pi^+$ For other decays see Table S–Decay	51.0±2.4% 49.0±2.4%	116.2 110.3	189.0 185.0
	Σ^0		1192.3 ±0.2	4.86 ±0.07	$<1.0\times10^{-14}$	1.422		$\Lambda\gamma$ See Table S–Decay	100%	77.0	74.5
	Σ^-		1197.20 ±0.14		1.58×10^{-10} ±.05	1.433		$n\pi^-$ For other decays see Table S–Decay	100%	118.1	192.8
	Ξ^0	1/2(1/2⁺) ?	1314.3 ±1.0	6.5 ±1.0	3.05×10^{-10} ±.38 X scale = 1.3	1.727		$\Lambda\pi^0$ For other decays see Table S–Decay	100%	63.9	134.8
	Ξ^-		1320.8 ±0.2 X scale = 1.2		1.75×10^{-10} ±.05 X scale = 1.1	1.745		$\Lambda\pi^-$ $\Lambda e^-\nu$ $n\pi^-$	100% $\le1.7\times10^{-3}$ $<5\times10^{-3}$	65.8 204.9 241.7	138.7 189.4 303.0
	Ω^-	0(3/2⁺) ? ?	1675 ±3		1.3×10^{-10} ±.7	2.806		$\Xi\pi$ $\Lambda\bar{K}$	? ?	221 66	296 216

† In units of $(e/2m_e)$.

A. H. Rosenfeld, A. Barbaro-Galtieri, W. H. Barkas, P. L. Bastien, J. Kirz, and M. Roos, UCRL-8030 - Part I, August, 1965.

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Table S–Decay

An Appendix to Table S for decay parameters and branching fractions

	Partial mode	Fraction	Q (MeV)	p or p_{max} (MeV/c)	α†	β†	γ†	Δ†
$K^\pm$	$\mu^\pm\nu$	(63.2 ±.4)%	388.1	235.6				
	$\pi^\pm\pi^0$	(21.3 ±.4)%	219.2	205.2				
	$\pi^\pm\pi^+\pi^-$	(5.52±.08)%	75.0	125.5				
	$\pi^\pm\pi^0\pi^0$	(1.68±.05)%	84.3	133.0				
	$\mu^\pm\pi^0\nu$	(3.4 ±.2)%	253.1	215.2				
	$e^\pm\pi^0\nu$	(4.9 ±.2)% Xscale=1.4	358.3	228.4				
	[illegible]	$(4.3 \pm.9)10^{-5}$	214.1	203.5				
	[illegible]	$<0.1\times10^{-5}$	214.1	203.5				
	[illegible]	$(2.2 \pm0.7)10^{-4}$	219.2	205.2				
	[illegible]	$<1.2\times10^{-5}$	109.0	151.1				
	[illegible]	$<1.1\times10^{-6}$	353.2	227.2				
	[illegible]	$<3\times10^{-6}$	142.9	171.9				
	[illegible]	$<1.6\times10^{-3}$	493.3	246.9				
	[illegible]	$(9 \pm4)10^{-5}$	75.0	125.5				
Λ	$p\pi^-$	(66.3 ±1.0)% Xscale=1.2	37.6	100.2	+0.65±0.047			(15±20)°
	$n\pi^0$	(33.6 ±1.0)%	40.9	103.7				
	$p\mu\nu$	$(1.5 \pm1.2)10^{-4}$	71.5	130.8				
	$pe\nu$	$(0.88\pm.08)10^{-3}$ Xscale = 1.3	176.7	163.1				
Σ^+	$p\pi^0$	(51.0 ±2.4)%	116.2	189.0	-0.79±.09			
	$n\pi^+$	(49.0 ±2.4)%	110.3	185.1	-0.05±0.08			
	$n\pi^+\gamma$	$\approx0.2\times10^{-4}$	110.3	185.1				
	$\Lambda e^+\nu$	$\approx0.2\times10^{-4}$	73.4	71.6				
	$p\gamma$	$(3.7 \pm0.8)10^{-4}$	251.1	224.6				
	$n\mu^+\nu$	$<1.1\times10^{-4}$	144.2	202.4				
	$ne^+\nu$	$<0.5\times10^{-4}$	249.3	223.6				
Σ^0	$\Lambda\gamma$	100%	77.0	74.5				
Σ^-	$n\pi^-$	100%	118.1	192.8	-0.16±.21			
	$n\pi^-\gamma$	$\approx0.1\times10^{-4}$	118.1	192.8				
	$n\mu^-\nu$	$(0.66\pm.15)10^{-3}$	152.0	209.4				
	$ne^-\nu$	$(1.2 \pm0.2)10^{-3}$	257.1	229.9				
	$\Lambda e^-\nu$	$(0.75\pm.28)10^{-4}$	81.2	79.0				
Ξ^0	$\Lambda\pi^0$	≈100%	63.9	134.8	-0.34±.12	0.05	0.94	(8±62)°
	$p\pi^-$	<2.7%	236.5	298.7				
	$pe^-\nu$	<2.7%	375.5	322.2				
	$\Sigma^+e^-\nu$	<1.3%	124.4	119.0				
	$\Sigma^-e^+\nu$		116.6	111.9				
Ξ^-	$\Lambda\pi^-$	100%	65.8	138.7	-0.410±.046	+0.12	0.90	(-17±18)°
	$\Lambda e^-\nu$	$\le1.7\times10^{-3}$	204.9	189.4				
	$n\pi^-$	$<5\times10^{-3}$	241.7	303.0				

† The definition of these quantities is taken as follows:

$\alpha = \frac{2\,Re(S^*P)}{|S|^2+|P|^2}$; $\beta = \frac{2\,Im(S^*P)}{|S|^2+|P|^2}$; $\gamma = \frac{|S|^2-|P|^2}{|S|^2+|P|^2}$; $\tan\Delta = \frac{\beta}{\alpha}$.

Mesons

	Mass (MeV)	$I(J^{PG})CA$ Symbol ⊢⊣=estab.		Γ (MeV)	$(Mass)^2$ ΓM^2 $(BeV)^2$	Partial modes	Fraction (%)	Q (MeV)	p or p_{max} (MeV/c)
η	548.9 ±0.5	$0(0^{-+})C^+A^-$	η_β	<10	0.301 ≤ 0.01	See Table S			
ω	782.8 ±0.5 Xscale=1.9	$0(1^{--})C^-A^-$	η_γ	12.0 ±1.7 Xscale=1.2	0.613 0.019	$\pi^+\pi^-\pi^0$ $\pi^+\pi^-$ neutral($\pi^0\gamma$) η+neutral $\pi^+\pi^-\gamma$ e^+e^- $\mu^+\mu^-$	88 seen † 12±2 <1.7 <3.2 ≈0.01 <0.10	369 504 648 234 504 782 572	327 366 380 199 366 391 377
X⁰ or η′	958.6 ±1.6	$0(0^{-+})C^+A^-$	η_β	<4	0.920 <0.008	$\eta\pi\pi$ $\pi^+\pi^-\gamma$	76±4 24±4 Xscale=1.2	131 680	232 459
K_1K_1	≈1000	May be just large $\bar{K}K$ scattering length, see listings of data cards.							
φ	1019.5 ±0.3 Xscale=1.7	$0(1^{--})C^-A^+$	η_γ	3.3 ±0.6	1.039 0.007	K_1K_2 K^+K^- πρ+3π $\pi^0\gamma$ η+neutral $\mu^+\mu^-$ e^+e^-	38±3 30±3 32±8 Xscale=1.4 <12 <0.5 <0.4	23 32 117 885 471 808 1018	109 126 188 501 362 499 510
f	1253 ± 20	$0(2^{++})C^+A^+$	η_α^{II}	118 ±16	1.571 0.294	ππ 4π $K\bar{K}$	large <4 <4	974 695 265	611 547 386
D	1286 ±6	$0(1^{++})C^+A^-$	η	40 ±6	1.65 0.105	$K\bar{K}\pi$		154	303
E (a)	1420 ±10	$0(\ \ )CA^-$? ?	η	60 ± 10	2.02 0.17	$K^*\bar{K}$ $K\bar{K}\pi$	large	35 293	151 430
f′	1500	$0(2^{++})C^+A$	η_α^{II}	80	2.25 0.24	K_1K_1 $K\bar{K}^*(890)$		505 111	561 274
$\pi^\pm$ π^0	139.6 135.0	$1(0^{-})C_n^+A^-$	π_β		0.019 0.018	See Table S			
ρ	765 ±3 Xscale=1.3	$1(1^{+-})C_n^+A^+$	π_γ	124 ±4 Xscale=2.8	0.585 0.173	2π 4π πγ e^+e^-	100 <5 <2 ≈.0065	486 207 626 764	357 243 370 382
A1 (b)	1072 ± 8 Xscale=1.6	$1(1^{+-})C_n^+A^-$	π	125	1.150 0.27	ρπ $K\bar{K}$	≈100 <5	167 C forbidden for odd J	231
B (b)	1220	$1(\geq1^{?+})C_n^-A^+$	π	125 ±17 Xscale=2.2	1.488 0.31	ωπ ππ $K\bar{K}$ 4π	≈100 <30 <10 <50	298 {Permitted only for 1^- assignment, if J<3 662	339 528
A2	1324 ±9 Xscale=2.5	$1(2^{+-})C_n^+$	π_α^{II}	90 ±10	1.753 0.24	ρπ $K\bar{K}$ ηπ	≈91 5.5±1.5 3.6±3.0 Xscale=1.3	419 333 636	426 439 537
K $K^\pm$ K^0	493.8 497.8	$1/2(0^-)A^-$	K_β		0.244 0.248	See Table S			
κ (b)	725 ±2	$1/2(0^+)A^+$	K	<12	0.526 <0.017	Kπ	≈100	92	154
K*	891.4 ±0.8	$1/2(1^-)A^+$	K_γ	49 ± 2 Xscale=1.1	0.794 0.087	Kπ Kππ κπ	≈100 <0.2 <0.2	258 118 27	288 215 82
C (a)	1215 ±15	$\leq3/2(\ )A^-$? ?	K	60 ±10	1.476 0.145	Kρ K*π	? ?	-44 184	<0 253
K*	1405 ±8	$1/2(2^+)A^+$	K	95 ±11	1.988 0.27	Kπ	?	775	610

† Reported values range between <0.5 and 1%, and depend on assumptions on ρ−ω interference.
(a) It has not been shown that this entry corresponds to a state with well defined quantum numbers.
(b) It has not been shown that this entry corresponds to a state with well defined quantum numbers. See text for references suggesting alternate mechanism.

A. H. Rosenfeld, A. Barbaro-Galtieri, W. H. Barkas, P. L. Bastien, J. Kirz, and M. Roos, UCRL-8030 - Part I, August 1965.

MUB-3409

Table IIIa. Multiple Coulomb scattering and Lorentz transformation

The rms projected angle θ due to multiple Coulomb scattering (only) of a particle of charge z, momentum P, velocity V is

$$\theta_{proj} = z\,\frac{15(MeV)}{PV(MeV)}\sqrt{\frac{L}{L_{(rad)}}}\,(1+\epsilon)\ \text{radians};$$

L = Length in scatterer; L(radiation) from Table II. For $L \geqslant 1/10\ L(rad)$ ϵ is generally < 1/10. The distribution of θ is not truly Gaussian. The rms projected displacement y on traversing an absorber of thickness L is

$$y_{rms} = L\theta_{proj}/\sqrt{3}$$

Lorentz transformations. Notation: Lower-case type for c.m. 4-momentum $(\vec{p}, w)$ and capitals for lab $(\vec{P}, W)$. (c≡1.) To transform from c.m. to lab write

$$\begin{pmatrix}\gamma&0&0&\eta\\0&1&0&0\\0&0&1&0\\\eta&0&0&\gamma\end{pmatrix}\begin{pmatrix}p\cos\theta\\p\sin\theta\\0\\w\end{pmatrix}=\begin{pmatrix}\gamma p\cos\theta+\eta w\\p\sin\theta\\0\\\eta p\cos\theta+\gamma w\end{pmatrix}=\begin{pmatrix}P\cos\Theta\\P\sin\Theta\\0\\W\end{pmatrix}$$

If two particles (1 and 2) collide, the invariant "mass" μ of the system is given by

$$\mu^2 = (W_1 + W_2)^2 - (\vec{P}_1 + \vec{P}_2)^2, \tag{1}$$

$$\gamma = \frac{W_1 + W_2}{\mu};\quad \eta = \left|\frac{\vec{P}_1 + \vec{P}_2}{\mu}\right| = \gamma\beta. \tag{2}$$

Write T for lab kinetic energy, t for c.m.; thus $\mu = m_1 + m_2 + t_1 + t_2 = m_1 + m_2 + Q$. If the target is at rest $(0, m_2)$ μ simplifies:

$$\mu^2 = (m_1 + m_2)^2 + 2T_1m_2. \tag{3}$$

To get a threshold T_1, set μ = sum of masses of reaction products, then

$$[\Sigma m(\text{products})]^2 = (m_1 + m_2)^2 + 2T_1m_2. \tag{4}$$

Other invariants are: $w_1w_2 - p_1p_2\cos\theta_{12}$ (5)

and

$$\frac{1}{p}\,\frac{d^2\sigma}{d\omega dw}. \tag{6}$$

The max. lab angle that a particle of c.m. momentum p_i can have is given by

$$\sin\Theta_i = \frac{\eta_i}{\eta}\ \left(\eta_i = \frac{p_i}{m_i}\ \text{must be} < \eta\right); \tag{7}$$

If $\eta_i > \eta$, then of course Θ_i can be π.
Crawford's mnemonic for extending nonrelativistic formulas to relativistic case: "To the rest energy of each moving particle add Q/2" where Q = the total kinetic energy (c.m.) = $\mu - \Sigma m_i$. Thus in the rest frame of a two-body decay the kinetic energy Q is shared between the two particles according to

$$t_1 = Q\,\frac{m_2 + Q/2}{\mu},\quad t_2 = Q\,\frac{m_1 + Q/2}{\mu}. \tag{8}$$

The above of course applies in the c.m. for the production of a two-body final state. To express t in terms of p, apply the mnemonic to a single particle (then Q = t). The non-rel. relation $p^2 = 2tm$ becomes

$$p^2 = 2t(m + t/2) = 2tm + t^2. \tag{9}$$

Energy Transfer for elastic collisions of beam (P_1, W_1) with resting target $(0, m_2)$, is

$$T_2 = 2m_2\,\frac{P_1^2}{\mu^2}\,\sin^2(\theta_{c.m.}/2). \tag{10}$$

Note that for max T_2, $\theta_{c.m.} = \pi$, so

$$T_{2max.} = 2m_2\,P_1^2/\mu^2 \approx 2\,m_2\eta^2. \tag{11}$$

MUB-1849

Table II. Atomic and nuclear properties (dE/dx, collision mean free path, radiation length, etc.) of materials used as absorbers and detectors

Material	Z	A	Cross section σ [a] (barns)	$-\frac{dE}{dx}$ min [b] $\frac{Mev}{g/cm^2}$	Collision[a] length L_{coll} g/cm^2	L_{coll} cm	Radiation[c] length L_{rad} g/cm^2	L_{rad} cm	Density ρ (g/cm^3)
H_2	1	1.01	0.063	4.14	26.5	374	58	819.0	0.0708 {boiling at 1 atmos
Li	3	6.94	0.23	1.72	50.4	94.3	77.5	145	0.534
Be	4	9.01	0.28	1.71	55.0	29.9	62.2	33.8	1.84
C	6	12.00	0.33	1.86	60.4	39.0	42.5	27.4	1.55 (variable)
Al	13	26.97	0.57	1.66	79.2	29.3	23.9	8.86	2.70
Cu	29	63.57	1.00	1.45	105.4	11.8	12.8	1.44	8.9
Sn	50	118.70	1.55	1.27	129.7	17.8	8.54	1.17	7.30
Pb	82	207.21	2.20	1.12	156.2	13.8	5.8	0.51	11.34
U	92	238.07	2.42	1.095	163.6	8.75	5.5	0.29	18.7
Hydrogen (bubble chamber, -27.6°K)				0.243 Mev/cm	26.5	452	58	990	0.0586
Propane (C_3H_8, bubble chamber)				0.935 Mev/cm	48.9	119.3	44.7	109.0	0.41
Freon CF_3Br				2.3	87.1	58.0	17.25	11.5	1.5
Polystyrene (CH scintillator)				2.14 Mev/cm	54.9	52.3	43.4	41.3	~ 1.05
Ilford emulsion				5.49 Mev/cm	103	27.0	11.2	2.91	3.815

MUB-1831

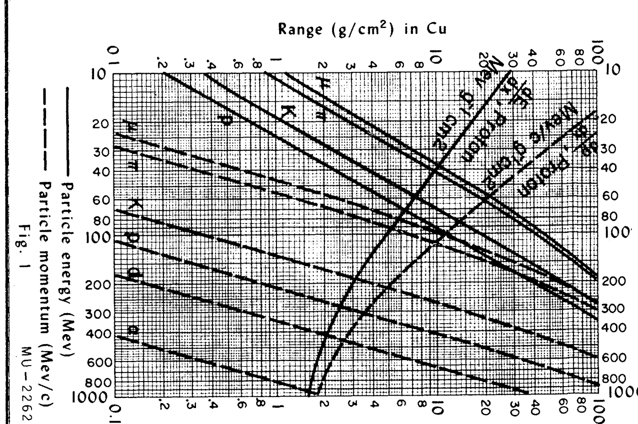

Fig. 1

MU-22623

Table of χ^2 for N degrees of freedom and confidence level CL

CL	1	2	3	4	5	7	10	15	20	25	30
	Degrees of freedom, N										
0.5	0.5	1.4	2.4	3.4	4.4	6.3	9.3	14.3	19.3	24.3	29.3
0.2	1.6	3.2	4.6	6.0	7.3	9.8	13.4	19.3	25.0	30.7	36.3
0.1	2.7	4.6	6.3	7.8	9.2	12.0	16.0	22.3	28.4	34.4	40.3
0.05	3.8	6.0	7.8	9.5	11.1	14.1	18.3	25.0	31.4	37.7	43.8
0.02	5.4	7.8	9.8	11.7	13.4	16.6	21.2	28.3	35.0	41.6	48.0
0.01	6.6	9.2	11.3	13.3	15.1	18.5	23.2	30.6	37.6	44.3	50.9
0.005	7.9	10.6	12.8	14.9	16.7	20.3	25.2	32.8	40.0	47.0	53.7
0.001	10.8	13.8	16.3	18.5	20.5	24.3	29.6	37.7	45.3	52.6	59.7
0.0001	15.1	18.4	21.1	23.5	25.7	29.9	35.6	44.3	52.4	60.1	67.6

For $N > 30$ $\quad CL \approx (1/\sqrt{2\pi})\int_y^\infty \exp(-y^2/2)dy; \quad y = \sqrt{2\chi^2} - \sqrt{2n-1}$

MUB-6202

TABLES FROM UCRL-8030(rev.)

Table IV. Atomic and nuclear constants in units of MeV, cm, and sec [a]

GENERAL ATOMIC CONSTANTS

$N = 6.02252 \times 10^{23}$ molecules/mole[b]

$c = 2.997925 \times 10^{10}$ cm/sec

$e = 4.80298 \times 10^{-10}$ esu $= 1.6021 \times 10^{-19}$ coulomb.

1 MeV $= 1.6021 \times 10^{-6}$ erg [1 ev $= e(10^8/c)$]

$\hbar = 6.5820 \times 10^{-22}$ MeV sec $= 1.05450 \times 10^{-27}$ erg sec.

$\hbar c = 1.9732 \times 10^{-11}$ MeV cm [$= \lambda\!\!\!^-$ for p = 1 MeV/c]

$k = 8.6171 \times 10^{-11}$ MeV/°C [Boltzmann constant]

$\alpha = \frac{e^2}{\hbar c} = 1/137.0388$; $e^2 = 1.4399 \times 10^{-13}$ MeV cm

Cross Section

$\sigma_{Thompson} = \frac{8}{3}\pi r_e^2 = 0.66516 \times 10^{-24} cm^2 = 0.66516$ barn

Magnetic Moment and Cyclotron Angular Frequency

$\mu_{Bohr} = \frac{e\hbar}{2mc} = 0.578815 \times 10^{-14}$ MeV/gauss

$\frac{1}{2}\omega_{cyclotron} = \frac{e}{2mc} = 8.79398 \times 10^6$ rad sec^{-1}/gauss

$g_{electron} = 2[1 + \frac{\alpha}{2\pi} - 0.328(\frac{\alpha}{\pi})^2] = 2[1.001159615]$[c]

$g_{muon} = 2[1 + \frac{\alpha}{2\pi} + 0.75(\frac{\alpha}{\pi})^2] = 2[1.001165010]$[c]

QUANTITIES DERIVED FROM THE ELECTRON MASS, m

Mass and Energy

$m = 0.511006$ MeV $= 1/1836.10\, m_p = 1/273.19\, m_\pi$

Rydberg, $R_\infty = \frac{me^4}{2\hbar^2} = mc^2 \times \frac{\alpha^2}{2} = 13.605$ eV

Length (1 fermi $= 10^{-13}$ cm; 1 A $= 10^{-8}$ cm)

$r_e = e^2/mc^2 = 2.81777$ fermi

$\lambda\!\!\!^-_{Compton} = \frac{\hbar}{mc} = r_e\alpha^{-1} = 3.86144 \times 10^{-11}$ cm

a_∞ Bohr $= \frac{\hbar^2}{me^2} = r_e\alpha^{-2} = 0.52967$ A

Hydrogen-like atom (Non. Rel.; $\mu \equiv$ reduced mass).

$E_n = \frac{1}{2}\frac{\mu z^2 e^4}{(n\hbar)^2}$; $a_{n=1} = \frac{\hbar^2}{\mu z e^2}$; $\left.\frac{v}{c}\right)_{rms} = \frac{ze^2}{n\hbar c}$

QUANTITIES DERIVED FROM THE PROTON MASS, m_p

Rest mass $= 938.256$ MeV/c^2 $= 1836.10\, m_e = 6.722\, m_\pi$

$= 1.0072766\, m_1$

where $m_1 = 1$ amu $= \frac{1}{12} C^{12} = 931.478$ MeV

Magnetic Moment and Cyclotron Angular Frequency

$\mu_p = \frac{e\hbar}{2m_p c} = 3.1524 \times 10^{-18}$ MeV/gauss

$\frac{1}{2}\omega_{cyclotron} = \frac{e}{2m_p c} = 4.7894 \times 10^3$ rad sec^{-1}/gauss

$\left.\frac{\mu}{\mu_p}\right)_{proton} = 2.79276$; $\left.\frac{\mu}{\mu_p}\right)_{neutron} = -1.9128$

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Table IV (continued)

QUANTITIES DERIVED FROM THE MASS OF THE CHARGED PION, m_π

Rest mass $= 139.60$ MeV/c^2 $= 273.19\, m_e = 0.14878\, m_p$

Length

$\frac{\hbar}{m_\pi c} = 1.4135$ fermi ($\sim \sqrt{2}$ fermi)

Natural ($\approx$ "geometrical") Nucleon Cross Section

$\pi\left(\frac{\hbar}{m_\pi c}\right)^2 = 62.7655$ mb (1 mb $= 10^{-27}$ cm^2)

(3/2, 3/2)πp Resonance of mass 1237 MeV (Q = 159 MeV).

Center-of-mass momentum: $p_\pi = 230$ MeV/c

Lab-system momentum: $P_\pi = 303$ MeV/c ($T_\pi = 195$ MeV)

RADIOACTIVITY

1 curie $= 3.7 \times 10^{10}$ disintegrations/sec

1 R $= 87.8$ ergs/g air $= 5.49 \times 10^7$ MeV/g air

Fluxes (per cm^2) to liberate 1 R in carbon:

3×10^7 minimum ionizing singly charged particles
0.9×10^9 photons of 1 MeV energy.

(These fluxes are actually correct to within a factor of two for all materials.)

Natural background: 100 mR/year

"Tolerance" 100 millirem/week [Note, 1 R may produce up to 10 "Rem" (R equivalent for man), depending on type of radiation.]

MISCELLANEOUS

Physical Constants

1 year $= 3.1536 \times 10^7$ sec ($\approx \pi \times 10^7$ sec)

Density of air $= 1.205$ mg/cm^3 at 20°C

Acceleration by gravity $= 980.67$ cm/sec^2

1 calorie $= 4.184$ joules

1 atmosphere $= 1033.2$ g/cm^2

Numerical Constants

1 radian $= 57.29578$ deg; $e = 2.71828$

ln 2 $= 0.69315$; $\log_{10} e = 0.43429$;
ln 10 $= 2.30259$; $\log_{10} 2 = 0.30103$.

Stirling's approximation

$\sqrt{2\pi n}\,(\frac{n}{e})^n < n! < \sqrt{2\pi n}\,(\frac{n}{e})^n (1 + \frac{1}{12n-1})$

Gaussianlike Distributions

For $n > -1$ but not necessarily integral:

$\int_0^\infty x^{2n+1} \exp\left[-\frac{x^2}{2\sigma^2}\right] dx = 2^n\, n!\, \sigma^{2n+2}$; $(\frac{1}{2})! = \sqrt{\pi}/2$

Relation between standard deviation σ and mean deviation α:

$2\sigma^2 = \pi\alpha^2$; $\sigma = 1.4826$ probable error.

Odds against exceeding one standard deviation = 2.15:1; two, 21:1; three, 370:1; four, 16,000:1; five, 1,700,000:1

[a] Based mainly on E. Richard Cohen and J. W. M. DuMond, "Present Status of our Knowledge of the Numerical Values of the Fundamental Physical Constants," Second International Conference on Nuclidic Masses, Vienna, Austria, July 15-19, 1963.

[b] Based on atomic weight of C^{12} being exactly 12.

[c] C. Sommerfield, Phys. Rev. 107, 328 (1957) and A. Petermans, Helv. Phys. Acta. 30, 407 (1957).

MUB-1848

Baryons

	Particle	Beam π and K (MeV) and (MeV/c)	$I(J^P)$ ⊢⊣ = estab.	Symbol	Mass (MeV)	Γ (MeV)	Mass² and Γ(M²) (BeV)²	Important decays: Partial mode	Fraction (%)	Q (MeV)	p or pmax (MeV/c)
N	p / n	See Table S	1/2(1/2⁺) ⊢⊣	N_α	938.2 / 939.6		0.88 / 0.88	See Table S			
N	$N^*_{1/2}(1480)$	550 MeV / 675 MeV/c	1/2(1/2⁺)	Existence not yet definitely established							
N	$N^*_{1/2}(1518)$	610 MeV / 737 MeV/c	1/2(3/2⁻) ⊢⊣	N_γ	1518 ±10	120	2.30 / 0.37	πN / Nππ	75	440 / 301	454 / 408
N	$N^*_{1/2}(1688)$	900 MeV / 1030 MeV/c	1/2(5/2⁺) ⊢⊣	N^{II}_α	1688	100	2.85 / 0.34	πN / Nππ / ηN / ΛK	≈85 / / <2 /	610 / 471 / 201 / 75	572 / 538 / 389 / 231
N	$N^*_{1/2}(2190)$	1935 MeV / 2070 MeV/c	1/2(7/2⁻) ⊢⊣??	N^{II}_γ(?)	2190	≈200	4.80 / 0.88	πN / ΛK	≈40 / seen	1112 / 577	888 / 710
N	$N^*_{1/2}(2650)$	3113 MeV / 3250 MeV/c	1/2(9/2⁺) ⊢⊣??	N^{III}_α	2645 ±10	≈200	7.00 / 1.06	πN / ηN		1567 / 1158	1151 / 1090
Δ	$N^*_{3/2}(1236)$	196 MeV / 305 MeV/c	3/2(3/2⁺) ⊢⊣	Δ_δ	1236.0 ±0.4	120.0 ±1.5	1.53 / 0.30	πN	100	160	233
Δ	$N^*_{3/2}(1924)$	1354 MeV / 1488 MeV/c	3/2(7/2⁺) ⊢⊣	Δ^{II}_δ	1924	170	3.70 / 0.65	πN / ΣK	<67	846 / 241	725 / 435
Δ	$N^*_{3/2}(2360)$	2349 MeV / 2485 MeV/c	3/2(9/2⁻) ⊢⊣??	Δ^{III}_β(?)	2360	~200	5.58 / 0.95	πN	≈15	1282	988
Δ	$N^*_{3/2}(2825)$	3633 MeV / 3770 MeV/c	3/2(11/2⁺) ⊢⊣??	Δ^{III}_δ	2825	260	7.98 / 1.47	πN		1747	1252
Λ	Λ	See Table S	0(1/2⁺) ⊢⊣	Λ_α	1115.4		1.24	See Table S			
Λ	$Y^*_0(1405)$	< 0 Kp	0(1/2⁻) ⊢⊣	Λ_β	1405	35±5	1.97 / 0.10	Σπ / Λππ	100 / <1	76 / 10	151 / 69
Λ	$Y^*_0(1520)$	137 MeV / 393 MeV/c	0(3/2⁻) ⊢⊣	Λ_γ	1518.9 ±1.5	16 ±2	2.31 / 0.05	Σπ / K̄N / Λππ	55±7 / 29±4 / 16±2	190 / 87 / 124	266 / 243 / 251
Λ	$Y^*_0(1815)$	662 MeV / 1045 MeV/c	0(5/2⁺) ⊢⊣	Λ^{II}_α	1815 ±5	50	3.29 / 0.18	K̄N / Σπ / Λππ [mainly $Y^*_1(1385)+\pi$] / Λη	≈75 / ≈9 / ≈15 / ≈1	378 / 486 / 420 / 151	538 / 504 / 515 / 344
Σ	Σ	See Table S	1(1/2⁺) ⊢⊣	Σ_α	(+) 1189.5 / (0) 1192.6 / (-) 1197.4		1.41 / 1.42 / 1.43	See Table S			
Σ	$Y^*_1(1385)$	< 0 Kp	1(3/2⁺) ⊢⊣	Σ_δ	1382.7 ±.5 Xscale=1.5	44 ±2 Xscale=2.8	1.91 / 0.12	Λπ / Σπ	90±2 / 10±2 Xscale=1.4	127 / 55	205 / 124
Σ	$Y^*_1(1660)$	374 MeV / 715 MeV/c	1(≥3/2) ⊢⊣	Σβ	1660 ±10	44 ±5	2.76 / 0.15	K̄N / Σπ / Λπ / Σππ [mainly $Y^*_0(1405)+\pi$] / Λππ	≈15 / ≈30 / ≈5 / ≈30 / ≈20	223 / 328 / 405 / 188 / 265	400 / 383 / 439 / 321 / 389
Σ	$Y^*_1(1765)$	561 MeV / 932 MeV/c	1(5/2⁻) ⊢⊣	Σ_β	1762 ±17	75 ±7 Xscale=2.1	3.11 / 0.26	K̄N / Λπ / Σπ / $Y^*_1(1385)+\pi$ / $Y^*_0(1520)+\pi$	≈60 / ≈16 / ≤3 / ≈10 / ≈10	328 / 510 / 436 / 243 / 10[illegible]	496 / 517 / 467 / 318 / 188
Σ	$Y^*_1(2065)$	1180 MeV / 1600 MeV/c	1(7/2⁺) ⊢⊣	Σ^{II}_δ	2065	≈160	4.26 / 0.74	K̄N / Λπ	~.35	632 / 819	728 / 726
Ξ	Ξ	See Table S	1/2(1/2⁺) ⊢⊣	Ξ_α	(-) 1321 / (0) 1314		1.75 / 1.73	See Table S			
Ξ	$\Xi^*(1530)$		1/2(3/2⁺) ⊢⊣ p wave	Ξ_δ	(-) 1529.7 ±0.9 Xscale = 1.1	7.5 ±1.7	2.34 / 0.02	Ξπ	≈100	73	148
Ξ	$\Xi^*(1816)$		1/2(3/2⁻) ⊢⊣	Ξ_γ	1816 ±3	≈16 ±4 Xscale=2.2	3.29 / 0.06	Ξ*π / ΛK̄ / Ξπ / Ξππ	≈25 / ≈65 / ≈5 / ≈5	149 / 205 / 362 / 222	232 / 394 / 413 / 312
Ξ	$\Xi^*(1933)$		1/2(5/2⁺)	Ξ	1933 ±16	140 ±35	3.74 / 0.54	Ξπ		473	501
Ω	Ω^-	See Table S	0(3/2⁺)	Ω_δ	1675 ±3		2.81	See Table S			

A. H. Rosenfeld, A. Barbaro-Galtieri, W. H. Barkas, P. L. Bastien, J. Kirz, and M. Roos, UCRL-8030 - Part I, August 1965.

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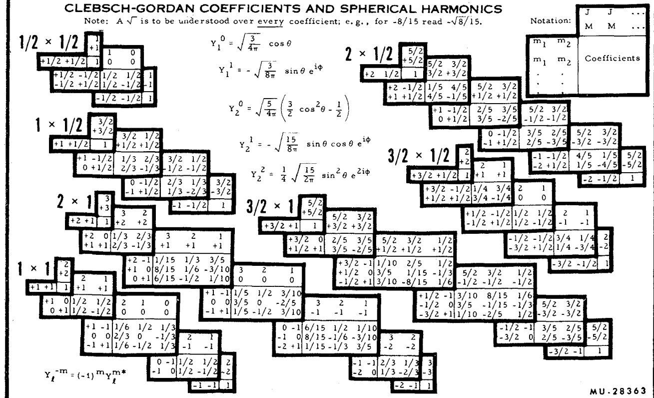
TABLE VII
CLEBSCH-GORDAN COEFFICIENTS AND SPHERICAL HARMONICS

Note: A $\sqrt{}$ is to be understood over every coefficient; e.g., for -8/15 read $-\sqrt{8/15}$.



$Y_1^0 = \sqrt{\frac{3}{4\pi}}\cos\theta$

$Y_1^1 = -\sqrt{\frac{3}{8\pi}}\sin\theta\, e^{i\phi}$

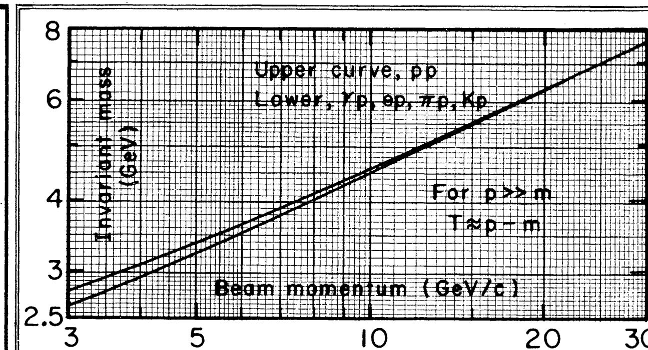
$Y_2^0 = \sqrt{\frac{5}{4\pi}}\left(\frac{3}{2}\cos^2\theta - \frac{1}{2}\right)$

$Y_2^1 = -\sqrt{\frac{15}{8\pi}}\sin\theta\cos\theta\, e^{i\phi}$

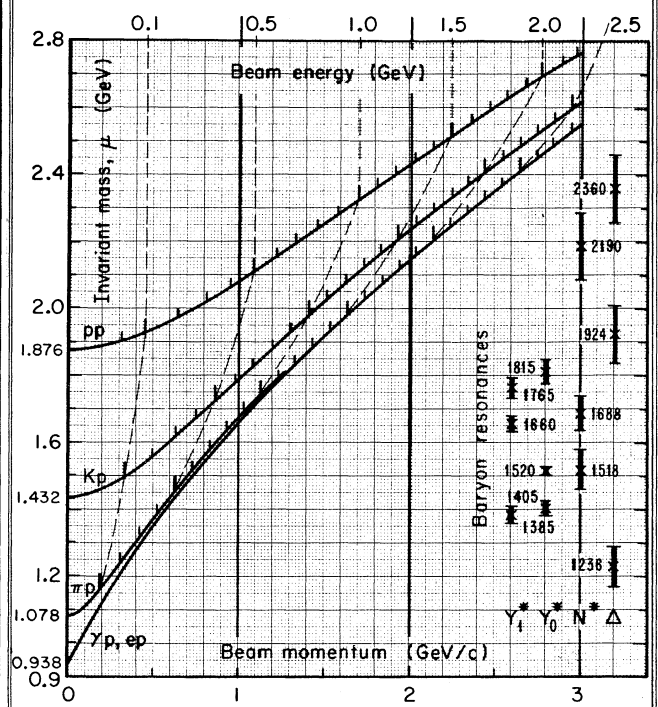
$Y_2^2 = \frac{1}{4}\sqrt{\frac{15}{2\pi}}\sin^2\theta\, e^{2i\phi}$

$Y_\ell^{-m} = (-1)^m Y_\ell^{m*}$

MU-28363



MUB-6203



MUB-6204

DATA ON BARYON RESONANCES Cont'd.

CODE EVENT QUANTITY ERROR+ ERROR- REFERENCE YR TECHNIQUE.
IN PEAK

• INDICATES DATA IGNORED BY PROGRAMS

$\Delta(1236)$

31 N•3/2 (1236 JP=3/2+) I=3/2

31 N•3/2(1236) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE	
U31M	1238.0			DE HOFFMANN	54	RVUE	
U31M •	1236.1	0.3		KLEPIKOV	60	RVUE	
U31M	1234.0			ROPER	64	RVUE	
U31M	1236.45	0.65		OLSSON	64	RVUE	0
U31M	1236.0	0.55		OLSSON	64	RVUE	++
U31M	1232.0	6.0		FERRO-LUZZI	65	HBC	

31 N•3/2(1236) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE	
U31W •	42.8	LOWER HALF WIDTH		DE HOFFMANN	54	RVUE	
U31W •	118.9	5.9		KLEPIKOV	60	RVUE	
U31W	120.0	2.0		OLSSON	64	RVUE	++
U31W	119.6	2.4		OLSSON	64	RVUE	0
U31W •	82.0	UPPER HALF WIDTH		VIK	63	CNTR	
U31W	145.0	14.0		GIDAL	65	DBC	- 3BODY FIN.ST.
U31W	125.0	30.0		FERRO-LUZZI	65	HBC	

31 N•3/2(1236) MASS.DIFF. (-) - (++) (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U31D1	7.9	6.8		GIDAL	65	DBC

31 N•3/2(1236) MASS DIFF. (0) - (++) (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U31D2	0.45	0.85		OLSSON	64	RVUE

31 N•3/2(1236) HALF WIDTH DIFF.(-)-(++) (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U31D1•W	25.0	23.0		GIDAL	65	DBC

31 N•3/2(1236) PARTIAL DECAY MODES

U31P1	N•312(1236) INTO N PI	S16S 8

$\Delta(1640)$

32 N•3/2 (1640,JP=) I=3/2

EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

32 N•3/2(1640) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U32M •	1680.0	APPROX		CARRUTHERS	60	RVUE
U32M •	1632.0	APPROX		DEVLIN	62	CNTR
U32M	1648.0	12.0		DEVLIN	65	CNTR

32 N•3/2(1640) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U32W •	51.0	22.0	LOWER HALF	DEVLIN	65	CNTR
U32W •	150.0	71.0	UPPER HALF	DEVLIN	65	CNTR

32 N•3/2(1640) PARTIAL DECAY MODES

U32P1	N•3/2(1640) INTO N PI	S16S 8

32 N•3/2(1640) BRANCHING RATIOS

CODE	QUANTITY	REFERENCE	YR	TECHNIQUE	
U32R1•	N•3/2(1640) INTO (N PI)/TOTAL				(P1)/TOTAL
U32R1	0.56	DEVLIN	65	CNTR	

$\Delta(1920)$

33 N•3/2 (1920,JP=7/2+) I=3/2

33 N•3/2(1920) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U33M	1922.0			DEVLIN	62	CNTR
U33M	1926.0			AUVIL	64	RVUE
U33M	1900.0	9.0		DEVLIN	65	CNTR

33 N•3/2(1920) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U33W •	109.0	LOWER HALF WIDTH		AUVIL	64	RVUE
U33W •	58.6	HIGHER HALF WIDTH		AUVIL	64	RVUE
U33W •	126.0	31.0	LOWER HALF	DEVLIN	65	CNTR
U33W •	130.0	24.0	UPPER HALF	DEVLIN	65	CNTR

33 N•3/2(1920) PARTIAL DECAY MODES

U33P1	N•1/2(1920) INTO N PI	S16S 8
U33P2	N•1/2(1920) INTO SIGMA K	S19S10

33 N•3/2(1920) BRANCHING RATIOS

CODE	QUANTITY	REFERENCE	YR	TECHNIQUE	
U33R1•	N•3/2(1920) INTO (N PI)/TOTAL				(P1)/TOTAL
U33R1	0.67	AUVIL	64	RVUE	
U33R1	0.57	DEVLIN	65	CNTR	

$\Delta(2360)$

34 N•3/2 (2360,JP=9/2-) I=3/2

SPIN,PARITY ASSIGNMENT NOT FINAL

34 N•3/2(2360) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE	
U34M	2360.0			DIDDENS	63	CNTR	
U34M	2440.			HOHLER	64	RVUE	
U34M •	2400.0	APPROX		WAHLIG	64	SPRK	0

34 N•3/2(2360) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U34W	200.0			DIDDENS	63	CNTR

34 N•3/2(2360) PARTIAL DECAY MODES

U34P1	N•3/2(2360) INTO N PI	S16S 8
U34P1•	PI P FRACTION BASED ON GUESS THAT J=9/2	

$\Delta(2825)$

36 N•3/2 (2825,JP=11/2+) I=3/2

36 N•3/2 (2825) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE	
U36M	2825.0	15.0		CITRON	64	CNTR	
U36M	2870.			HOHLER	64	RVUE	
U36M •	2700.0	APPROX		WAHLIG	64	SPRK	0

36 N•3/2 (2825) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U36W	260.0			CITRON	64	CNTR

36 N•3/2 (2825) PARTIAL DECAY MODES

$Y_0^*(1405)$

37 Y•0 (1405,JP=) I=0

37 Y•0(1405) MASS (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U37M	1405.0			ALSTON	62	HBC
U37M	1405.0			ALEXANDER	62	HBC

37 Y•0(1405) WIDTH (MEV)

CODE	QUANTITY	ERROR+	ERROR-	REFERENCE	YR	TECHNIQUE
U37W	50.0			ALSTON	62	HBC
U37W	35.0	5.0		ALEXANDER	62	HBC

37 Y•0(1405) PARTIAL DECAY MODES

U37P1	Y•0(1405) INTO SIGMA PI	S19S 8
U37P2	Y•0(1405) INTO LAMBDA 2PI	S18S 8S 8

37 Y•0(1405) BRANCHING RATIOS

CODE	QUANTITY	REFERENCE	YR	TECHNIQUE	
U37R1•	Y•0(1405) INTO (LAMBD 2PI)/(SIGMA PI)				(P2)/(P1)
U37R1•	0.01 OR LESS	HUWE	65	HBC	

REFERENCES ON BARYON RESONANCES Cont'd.

$\Delta(1236)$

31 N•3/2 (1236,JP=3/2+) I=3/2

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
DE HOFFMANN	54	RVUE	F DE HOFFMANN +	PR	95	1587	54	RVUE	U31
KLEPIKOV	60	RVUE	N P KLEPIKOV +	REPORT		D584	60	DUBNA	U31
VIK	63	CNTR	O T VIK,H R RUGGE	PR	129	2311	63	L R L	U31
OLSSON	64	RVUE	M.G.OLSSON	PREPRINT			64	WISCONSIN	U31
FERRO-LUZZI	65	HBC	FERRO-LUZZI,GEORGE+	NC	36	1101	65	CERN	U31
GIDAL	65	DBC	GIDAL,KERNAN,KIM	UCRL		16096	65	L R L	U31

$\Delta(1640)$

32 N•3/2 (1640,JP=) I=3/2

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
CARRUTHERS	60	RVUE	P CARRUTHERS	PRL	4	303	60	RVUE	U32
DEVLIN	62	CNTR	DEVLIN,MOYER,PEREZMENDEZ	PR	125	690	62	L R L	U32
			AND J HELLAND +	PR	134	B1079	64	LRL	432
DEVLIN	65	CNTR	DEVLIN,SOLOMON,BERTSCH	PRL	14	1031	65	PRINCETON	U32

$\Delta(1920)$

33 N•3/2 (1920,JP=7/2+) I=3/2

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
DEVLIN	62	CNTR	DEVLIN,MOYER,PEREZMENDEZ	PR	125	690	62	L R L	U33
			AND J HELLAND +	PR	134	B1079	64	LRL	U33
AUVIL	64	RVUE	P AUVIL,C LOVELACE	NC	33	473	64	IMPER.COLLEGE	U33
DEVLIN	65	CNTR	DEVLIN,SOLOMON	PRL	14	1031	65	PRINCETON	U33

$\Delta(2360)$

34 N•3/2 (2360,JP=9/2-) I=3/2

SPIN,PARITY ASSIGNMENT NOT FINAL

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
DIDDENS	63	CNTR	A N DIDDENS +	PRL	10	262	63	B N L	U34
HOHLER	64	RVUE	G.HOHLER + J.GIESECKE	PL	12	149	64	KARLSRUHE	U34
WAHLIG	64	SPRK	M.A.WAHLIG	PRL	13	103	64	MIT	U34

QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS U34

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
DONNACHIE	64	RVUE	DONNACHIE+HAMILTON	ANP	31	410	65	UCL , J,P	U34
			PREVIOUS ASSIGNMENT BASED ON DISPERSION RELATION CALCULAT.						U34

$\Delta(2825)$

36 N•3/2(2825,JP=11/2+) I=3/2

SPIN,PARITY ASSIGNMENT NOT FINAL

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
WAHLIG	64	SPRK	M.A.WAHLIG	PRL	13	103	64	MIT	U36
CITRON	64	CNTR	A CITRON +	PRL	13	205	64	BNL	U36
HOHLER	64	RVUE	G.HOHLER + J.GIESECKE	PL	12	149	64	KARLSRUHE	U36

QUANTUM NUMBER DETERMINATION NOT REFERRED TO IN DATA CARDS U36

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
DONNACHIE	64	RVUE	DONNACHIE+HAMILTON	ANP	31	410	65	UCL , J,P	U36
			PREVIOUS ASSIGNMENT BASED ON DISPERSION RELATION CALCULAT.						U36

$Y_0^*(1405)$

37 Y•0 (1405,JP=) I=0

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
ALSTON	61	HBC	M H ALSTON +	PRL	6	698	62	L R L	U37
ALEXANDER	62	HBC	G ALEXANDER +	PRL	8	447	62	L R L	U37
ALSTON	62	HBC	M H ALSTON +	CERN		311	62	L R L	U37

QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

IDENTIFIC.	YR		AUTHORS	JOUR.	VOL	PAGE	YR	INSTITUTION	COD
ABRAMS	65	HBC	ABRAMS,SECHI-ZORN	BAPS	14	29	65	MARYLAND J,P	U37
KIM	65	HBC	JAE KWAN KIM	PRL	14	29	65	COLUMBIA J,P	U37
ENGLER	65	HBC	ENGLER,FISK,KRAEMER +	PRL	15	224	65	JP	U37
SAKITT	65	HBC	SAKITT,DAY,GLASSER +	PREPRINT			65	MARYLAND J,P	U37

DATA ON BARYON RESONANCES Cont'd.

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CODE EVENT QUANTITY  ERROR+    ERROR-     REFERENCE  YR TECHNIQUE.
     IN PEAK

  * INDICATES DATA IGNORED BY PROGRAMS
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$Y_0^*(1520)$

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                    38  Y*0 (1520,JP=3/2-)  I=0
                    38  Y*0(1520)  MASS (MEV)
U38M       1519.4      2.0              FERRO-LUZZI62 HBC
U38M   145 1517.0      3.0              GALTIERI   63 DBC
U38M       1520.0      4.0              ALMEIDA    64 HBC

                    38  Y*0(1520)  WIDTH (MEV)
U38W         16.0      2.0              FERRO-LUZZI62 HBC

                    38  Y*0(1520) PARTIAL DECAY MODES
U38P1    Y*(1520) INTO SIGMA PI                        S19S 8
U38P2    Y*(1520) INTO KBAR N                          S12S17
U38P3    Y*(1520) INTO LAMBDA PI+ PI-                  S18S 8S 8

                    38  Y*0(1520)  BRANCHING RATIOS
U38R1*   Y*0(1520) INTO SIG  PI                        (P1)/TOTAL
U38R1      0.546      0.067             WATSON     63 HBC
U38R2*   Y*0(1520) INTO K    N                         (P2)/TOTAL
U38R2      0.293      0.035             WATSON     63 HBC
U38R3*   Y*0(1520) INTO LAMBDA PI PI                   (P3)/TOTAL
U38R3      0.16       0.02              WATSON     63 HBC
```

$Y_0^*(1815)$

```
                    39  Y*0 (1815,JP=5/2 )  I=0
                    39  Y*0(1815)  MASS (MEV)
U39M       1815.0                       CHAMBERLAIN62 CNTR
U39M       1815.0      5.0              FERRO-LUZZI65 HBC

                    39  Y*0(1815)  WIDTH (MEV)
U39W        120.0                       CHAMBERLAIN62 CNTR
U39W         70.0                       GALTIERI   63 HBC
U39W         45.0      5.0              FERRO-LUZZI65 HBC

                    39  Y*0(1815) PARTIAL DECAY MODES
U39P1    Y*0(1815) INTO KBAR N                         S12S17
U39P2    Y*0(1815) INTO SIGMA PI                       S19S 8
U39P3    Y*0(1815) INTO LAMBDA PI+ PI-                 S18S 8S 8
U39P4    Y*0(1815) INTO LAMBDA ETA                     S18S14
U39P5    Y*0(1815) INTO Y1(1385)+PI                    U43S 8

                    39  Y*0 (1815) BRANCHING RATIOS
U39R1*   Y*0(1815) INTO (KBAR N)/TOTAL                 (P1)/TOTAL
U39R1*     0.8    APPROX.               WOHL       64 HBC
U39R1*     0.70   APPROX.               FERRO-LUZZI65 HBC
U39R2*   Y*0(1815) INTO(SIGMA PI)/TOTAL                (P2)/TOTAL
U39R2*     0.09   APPROX.               FERRO-LUZZI65 HBC
U39R3*   Y*0(1815) INTO(LAMBDA 2PI)/TOTAL              (P3)/TOTAL
U39R4*   Y*0(1815) INTO (LAMBDA ETA)/TOTAL             (P4)/TOTAL
U39R4*     0.01   APPROX.               FERRO-LUZZI65 HBC
U39R5*   Y*0(1815) INTO (Y1(1385)+PI)/TOTAL            (P5)/TOTAL
U39R5*     0.15   APPROX.               FERRO-LUZZI65 HBC
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$Y_0^*(2299)$

```
                    40  Y*0 (2299,JP=  )  I=0
          EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE
                    40  Y*0(2299)  MASS (MEV)
U40M       2245.0     25.0              BLANPIED   65 CNTR   0
U40M       2299.0                       BOCK       65 HBC

                    40  Y*0(2299)  WIDTH (MEV)
U40W        150.0                       BLANPIED   65 CNTR   0

                    40  Y*0(2299) PARTIAL DECAY MODES
U40P1    Y*0(2299) INTO K N PI                         S10S16S 8
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$Y_1^*(1385)$

```
                    43  Y*1 (1385,JP=3/2+)  I=1
                    43  Y*1(1385)  MASS (MEV)
U43M       1385.0                       ALSTON     60 HBC  +-
U43M       1382.0      3.0              DAHL       61 HBC   -
U43M   378 1376.0      3.0              ELY        61 PBC  +-
U43M       1384.0                       MARTIN     61 HBC  +0

U43M    85 1392.0      7.0              COLLEY     62 PBC   -0
U43M    51 1388.0                       COOPER     62 HBC  +-
U43M    76 1380.0      3.0              BERTANZA   63 HBC  +-
U43M   106 1381.0      4.0              CURTIS     63 SPRK   0

U43M   200 1392.0      6.2              COOPER     64 HBC   -
U43M   170 1375.0      3.9              COOPER     64 HBC  +
U43M    80 1384.0      4.0              FOELSCHE   64 HBC  +
U43M   803 1385.3      1.5              HUWE       64 HBC   -
U43M   681 1381.0      1.6              HUWE       64 HBC  +

U43M       1382.0      1.0              ARMENTEROS 65 HBC  +
U43M       1384.0      1.0              ARMENTEROS 65 HBC   -

                    43  Y*1(1385) MASS DIFF. (-) - (+)
U43D 1500     4.3      2.2              HUWE       64 HBC
U43D  370    17.0      7.0              COOPER     64 HBC
U43D          2.0      1.5              ARMENTEROS 65 HBC

                    43  Y*1(1385)  WIDTH (MEV)
U43W  154    48.0      8.0              ELY        61 PBC  +
U43W  239    51.0      6.5              COOPER     64 HBC  +
U43W   80    30.0      7.0              FOELSCHE   64 HBC  +
U43W  681    46.5      3.0              HUWE       64 HBC  +
U43W         32.0      3.0              ARMENTEROS 65 HBC  +

U43W   51    40.0                       COOPER     62 HBC  +-
U43W   76    50.0     10.0              BERTANZA   63 HBC  +-
U43W         29.0                       MARTIN     61 HBC  +0

U43W  224    66.0     10.0              ELY        61 PBC   -
U43W  269    88.0      6.5              COOPER     64 HBC   -
U43W  803    62.0      7.0              HUWE       64 HBC   -
U43W         38.0      3.0              ARMENTEROS 65 HBC   -
U43W   85    80.0     20.0              COLLEY     62 PBC   -0
U43W  106    30.0      9.0              CURTIS     63 SPRK   0

                    43  Y*1(1385) PARTIAL DECAY MODES
U43P1    Y*1(1385) INTO LAMBDA PI                      S18S 8
U43P2    Y*1(1385) INTO SIGMA PI                       S21S 9

                    43  Y*1(1385)  BRANCHING RATIOS
U43R1*  Y*1(1385) INTO (SIGMA+PI)/(LAMBDA+PI)          (P2)/(P1)
U43R1          0.04       0.04           BASTIEN    61 HBC  +-0
U43R1*         0.04       0.04  OR LESS  ALSTON     62 HBC
U43R1 100      0.09       0.04           HUWE       64 HBC
U43R1          0.14       0.03           ARMENTEROS 65 HBC
```

$Y_1^*(1660)$

```
                    44  Y*1 (1660,JP=    )  I=1
                    44  Y*1(1660)  MASS (MEV)
U44M       1685.0                       ALEXANDER  62 HBC   -0
U44M       1660.0     10.0              ALVAREZ    63 HBC  +

                    44  Y*1(1660)  WIDTH (MEV)
U44W         45.0      5.0              ALEXANDER  62 HBC   -0
U44W         40.0     10.0              ALVAREZ    63 HBC  +

                    44  Y*1(1660) PARTIAL DECAY MODES
U44P1    Y*1(1660) INTO LAMBDA PI                      S18S 8
U44P2    Y*1(1660) INTO SIG PI                         S21S 8
U44P3    Y*1(1660) INTO LAMBDA 2PI                     S18S 8S 8
U44P4    Y*1(1660) INTO SIGMA 2PI                      S21S 8S 8
U44P5    Y*1(1660) INTO KBAR N                         S12S17
U44P6    Y*1(1660) INTO  Y*0(1405)+PI                  U37S 8

                    44  Y*1(1660)  BRANCHING RATIOS
U44R1*  Y*1(1660)  INTO LAMBDA+PI                      (P1)/TOTAL
U44R1 130   0.32                        ALVAREZ    63 HBC  +
U44R1*      0.07     OR LESS            BASTIEN    63 HBC

U44R2*  Y*1(1660) INTO SIGMA +PI                       (P2)/TOTAL
U44R2 130   0.27                        ALVAREZ    63 HBC  +
U44R2       0.26       0.05             BASTIEN    63 HBC

U44R3*  Y*1(1660) INTO LAMBDA+2PI                      (P3)/TOTAL
U44R3  90   0.18                        ALVAREZ    63 HBC  +
U44R3       0.19       0.06             BASTIEN    63 HBC

U44R4*  Y*1(1660) INTO SIGMA +2PI                      (P4)/TOTAL
U44R4 180   0.18                        ALVAREZ    63 HBC  +
U44R4       0.28       0.07             BASTIEN    63 HBC

U44R5*  Y*1(1660) INTO K-N                             (P5)/TOTAL
U44R5*      0.05 OR LESS                ALVAREZ    63 HBC  +
U44R5*      0.18       0.06   OR MORE   BASTIEN    63 HBC

U44R6*    Y*1(1660) INTO (SIGMA PI)/(LAMBDA PI)        (P2)/(P1)
U44R6*      0.86                        SMITH      63 HBC
U44R6       6.8        3.0              HUWE       64 HBC

U44R7*    Y*1(1660) INTO (LAMBDA 2PI)/(LAMBDA PI)      (P3)/(P1)
U44R7*      0.142                       SMITH      63 HBC

U44R8*    Y*1(1660) INTO (KBAR N)/(LAMBDA PI)          (P5)/(P1)
U44R8*      0.43       0.21             SMITH      63 HBC

U44R9*    Y*1(1660) INTO (Y*0(1405)+PI)/(SIG+2PI)      (P6)/(P4)
U44R9*    MAINLY  Y*0(1405)+PI          EBERHARD   65 HBC  +
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REFERENCES ON BARYON RESONANCES Cont'd.

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IDENTIFIC.  YR AUTHORS                        JOUR.VOL PAGE YR INSTITUTION      COD
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$Y_0^*(1520)$

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                           38  Y*0 (1520,JP=3/2-)  I=0
FERRO-LUZZI 62 HBC  M FERRO-LUZZI +            PRL     8   28 62 L R L          U38
GALTIERI    63 DBC  A BARBARO GALTIERI +       PL      6  296 63 L R L          U38
WATSON      63 HBC  WATSON,FERROLUZZI,TRIPP PR       131 2248 63 L R L          U38
ALMEIDA     64 HBC  S ALMEIDA,LYNCH            PL      9  204 64 CERN           U38
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$Y_0^*(1815)$

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                           39  Y*0 (1815,JP=5/2+)  I=0
CHAMBERLAIN 62 CNTR O CHAMBERLAIN +            PR    125 1696 62 L R L          U39
GALTIERI    63 HBC  A BARBARO GALTIERI +       PL      6  296 63 L R L          U39
FERRO-LUZZI 65 HBC  FERRO-LUZZI +              APS-WASHINGTON65 CERN+CHIC+HID+SAU39

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

BEALL       62 SPRK E F BEALL +                CERN       368 62 L R L          U39
                                          ALSO SIENA      123 63 L R L          U39
SODICKSON   64 SPRK L SODICKSON +              PR    133 B757 64 M I T          U39
WOHL        64 HBC  C WOHL,S WOJCICKI +        PRIV.  COMM.  64 L R L           U39
BERGE       65 HDBC BERGE,ELY,KALMUS+          UCRL     16252 65 L R L      J,P U39
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$Y_0^*(2299)$

```
                           40  Y*0 (2299,JP=  )  I=0
BLANPIED    65 CNTR BLANPIED,GREENBERG +       PRL    14  741 65 YALE           U40
BOCK        65 HBC  BOCK,COOPER,FRENCH+        PL     17  166 65 CERN+SACLAY    U40
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$Y_1^*(1385)$

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                           43  Y*1 (1385,JP=3/2+)  I=1
ALSTON      60 HBC  M H ALSTON +               PRL     5  520 60 L R L          U43
DAHL        61 HBC  D DAHL +                   PRL     6  142 61 L R L          U43
BASTIEN     61 HBC  BASTIEN,                   PRL            61 L R L          U43
MARTIN      61 HBC  M J MARTIN,LEIPUNER +      PRL     6  283 61 YALE,BNL       U43
ELY         61 PBC  R P ELY +                  PRL     7  461 61 L R L          U43

ALSTON      62 HBC  M ALSTON,ALVAREZ +         CERN       311 62 L R L          U43
COLLEY      62 PBC  D COLLEY +                 PR    128 1930 62 COL+RUT        U43
COOPER      62 HBC  W A COOPER +               CERN       298 62 CERN+ZEEM+GLA  U43
BERTANZA    63 HBC  L BERTANZA +               PRL    10  176 63 BNL+SYR        U43
CURTIS      63 SPRK L J CURTIS +               PR    132 1771 63 MICHIGAN       U43

COOPER      64 HBC  WA COOPER +                PL      8  365 64 CERN+ZEEMAN    U43
FOELSCHE    64 HBC  FOELSCHE,LOPEZ-CEPERO + DUBNA           64 B N L          U43
HUWE        64 HBC  D O HUWE                   UCRL     11291 64 L R L          U43
ARMENTEROS  65 HBC  ARMENTEROS,FERRO-LUZZI +PREPRINT CERN 65 CERN,HEIDEL,SAC U43

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

SHAFER      63 HBC  J B SHAFER +               PRL    10  179 63 J P            U43
SHAFER      64 HBC  J.B.SHAFER + D.D.HUWE      PR    134 B1372 64 LRL           U43
MALAMUD     64 HBC  E.MALAMUD + P.E.SCHLEIN PL        10  145 64 CERN           U43
```

$Y_1^*(1660)$

```
                           44  Y*1 (1660,JP=    )  I=1
ALEXANDER   62 HBC  G ALEXANDER +              CERN       320 62 L R L          U44
ALVAREZ     63 HBC  L W ALVAREZ +              PRL    10  184 63 L R L          U44
SMITH       63 RVUE G A SMITH                  ATHENS      67 63 L R L          U44
HUWE        64 HBC  D H HUWE                   UCRL     11291 64 LRL            U44
EBERHARD    65 HBC  EBERHARD,SHIVELY+          PRL    14  466 65 LRL,ILLINOIS   U44

          QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS

BASTIEN     63 HBC  P L BASTIEN,J P BERGE      PRL    10  188 63 I J            U44
BASTIEN     63 HBC  P L BASTIEN                UCRL     10779 63 I J            U44
TAHER       63 HBC  M TAHER-ZADEH +            PRL    11  470 63 J P            U44
WILLIS      64 HBC  W.WILLIS +                 DUBNA          64 BNL        J,P U44
```

DATA ON BARYON RESONANCES Concluded

```
CODE EVENT QUANTITY  ERROR+    ERROR-    REFERENCE  YR TECHNIQUE.
    IN PEAK

     * INDICATES DATA IGNORED BY PROGRAMS
```

$Y_1^*(1765)$

```
                          45  Y*1(1765,JP=5/2 )  I=1
                          45  Y*1(1765)  MASS (MEV)

U45M      1765.0     10.0                 GALTIERI   63 HBC
U45M      1760.0     10.0                 FERRO-LUZZI65 HBC
U45M *    1755.0    APPROX.               YODH       65 HBC

                          45  Y*1(1765)  WIDTH (MEV)

U45W        60.0     10.0                 GALTIERI   63 HBC
U45W        90.0     10.0                 FERRO-LUZZI65 HBC
U45W *      40.0 OR MORE                  YODH       65 HBC

                          45  Y*1(1765) PARTIAL DECAY MODES

U45P1     Y*1(1765) INTO KBAR-N                                 S12S17
U45P2     Y*1(1765) INTO SIGMA PI                               S19S 8
U45P3     Y*1(1765) INTO LAMBDA PI                              S18S 8
U45P4     Y*1(1765) INTO Y*1(1385)+PI                           U43S 8
U45P5     Y*1(1765) INTO Y*0(1520)+PI                           U38S 8

                          45  Y*1(1765) BRANCHING RATIOS

U45R1*    Y*1(1765) INTO KBAR-N                                 (P1)/TOTAL
U45R1*      0.6     APPROX.               GALTIERI   63 DBC
U45R1*      0.50    APPROX.               FERRO-LUZZI65 HBC

U45R2*    Y*1(1765) INTO (SIGMA PI)/TOTAL                       (P2)/TOTAL
U45R2*     0.03 OR LESS                   FERRO-LUZZI65 HBC

U45R3*    Y*1(1765) INTO (LAMBDA PI)/TOTAL                      (P3)/TOTAL
U45R3*      0.16    APPROX.               FERRO-LUZZI65 HBC

U45R4*    Y*1(1765) INTO (Y*1(1385) PI)/TOTAL                   (P4)/TOTAL
U45R4*      0.10    APPROX.               FERRO-LUZZI65 HBC

U45R5*    Y*1(1765) INTO (Y*0(1520) PI)/TOTAL                   (P5)/TOTAL
U45R5*      0.10    APPROX.               FERRO-LUZZI65 HBC
```

$Y_1^*(1942)$

```
                          46  Y*1 (1942,JP=  )  I=1
               EVIDENCE NOT YET COMPELLING,OMITTED FROM TABLE

                          46  Y*1(1942)  MASS (MEV)

U46M      1942.0                          BOCK       65 HBC

                          46  Y*1(1942) PARTIAL DECAY MODES

U46P1     Y*1(1942) INTO K N PI                                 S10S16S 8
```

$Y_1^*(2070)$

```
                          47  Y*1 (2070,JP=  )  I=1
                          47  Y*1(2070)  MASS (MEV)

U47M      2022.0     20.0                 BLANPIED   65 CNTR   0
U47M      2097.0                          BOCK       65 HBC
U47M      2065.0                          WOHL       65 HBC

                          47  Y*1(2070) WIDTH (MEV)

U47W       120.0     20.0                 BLANPIED   65 CNTR   0
U47W        38.0                          BOCK       65 HBC
U47W *     180.0    APPROX.               WOHL       65 HBC

                          47  Y*1(2070) PARTIAL DECAY MODES

U47P1     Y*1(2070) INTO KBAR-N                                 S11S17
U47P2     Y*1(2070) INTO SIGMA PI                               S19S 8
U47P3     Y*1(2070) INTO LAMBDA PIO                             S18S 9

                          47  Y*1(2070)  BRANCHING RATIOS

U47R1*    Y*1(2070) INTO (KBAR-N)/TOTAL                         (P1)/(P1+P2+P3)
U47R1*      0.35    APPROX.               WOHL       65 HBC
```

$\Xi^*(1530)$

```
                          49  XI* (1530,JP=3/2+)  I=1/2
                          49  XI*(1530)  MASS (MEV)

U49M   57 1529.0      5.0                 PJERROU    62 HBC   -0
U49M   20 1535.0                          BERTANZA   62 HBC   -0
U49M      1535.7      4.7                 LONDON     64 HBC   -
U49M      1528.7      1.1                 LONDON     64 HBC    0
U49M      1532.0      2.0                 BADIER     64 HBC

                          49  XI*(1530)  WIDTH (MEV)

U49W * 57      7.0 OR LESS                PJERROU    62 HBC   -0
U49W * 20     35.0 OR LESS                BERTANZA   62 HBC   -0
U49W  100      7.0    2.0                 SCHLEIN    63 HBC    0
U49W           8.5    3.0                 LONDON     64 HBC   -0

                          49  XI*(-)-XI*(0) MASS DIFF.(MEV)
U49D   66      5.7    3.0                 PJERROU    65 HBC
```

$\Xi^*(1810)$

```
                          50  XI*(1820,JP=     )  I=1/2
                          50  XI*(1820)  MASS (MEV)

U50M   20 1770.0                          HALSTEINSLI63 FBC   -0
U50M *    1810.0     10.0                 SMITH      64 HBC
U50M      1820.0      7.0                 BADIER     64 HBC
U50M      1817.0      7.0                 SMITH      65 HBC
U50M      1814.0      4.0                 BADIER     65 HBC

                          50  XI*(1810)  WIDTH (MEV)

U50W * 20     80.0 OR LESS                HALSTEINSLI63 FBC   -0
U50W *        60.0    APPROX              SMITH      64 HBC
U50W *        60.0    APPROX              BADIER     64 HBC
U50W          12.0      4.0               BADIER     65 HBC
U50W          30.0      7.0               SMITH      65 HBC

                          50  XI*(1820) PARTIAL DECAY MODES

U50P1     XI*(1820) INTO XI*(1530) PI                           U49S 8
U50P2     XI*(1820) INTO LAMBDA KOBAR                           S18S11
U50P3     XI*(1820) INTO XI PI                                  S22S 9
U50P4     XI*(1820) INTO XI PI PI                               S22S 8S 8

                          50  XI*(1820) BRANCHING RATIOS
U50R1*    XI*(1820) INTO(XI*(1530) PI)/(LAMB.KBAR)              (P1/P2)
U50R1*      0.5     OR LESS               BADIER     64 HBC
U50R1       0.26      0.14                SMITH      65 HBC

U50R2*    XI*(1820) INTO(XI PI)/(LAMB.KBAR)                     (P3/P2)
U50R2*      0.1     OR LESS               BADIER     64 HBC
U50R2       0.13      0.13                BADIER     65 HBC
U50R2*      0.15    OR LESS               SMITH      65 HBC
      * PREVIOUS RATIO ASSUMES EXISTENCE OF XI*(1933)

U50R3*    XI*(1820) INTO(XI PI PI)/(LAMB.KBAR)                  (P4/P2)
U50R3*      0.5     OR LESS               BADIER     64 HBC
U50R3*      0.1     OR MORE               SMITH      65 HBC
U50R3*      0.10 OR LESS                  BADIER     65 HBC
```

$\Xi^*(1705)$

```
                          51  XI* (1705,JP=  )  I=1/2
                          51  XI*(1705) MASS (MEV)

U51M      1705.0                          SMITH      65 HBC

                          51  XI*(1705) WIDTH (MEV)

U51W *      20.0    APPROX.               SMITH      65 HBC

                          51  XI*(1705) PARTIAL DECAY MODES

U51P1     XI*(1705) INTO XI PI                                  S22S 8
U51P2     XI*(1705) INTO LAMBDA KBAR                            S18S 8
```

$\Xi^*(1933)$

```
                          52  XI* (1933,JP=  )  I=1/2
                          52  XI*(1933) MASS (MEV)

U52M      1933.0     16.0                 BADIER     65 HBC

                          52  XI*(1933) WIDTH (MEV)

U52W       140.0     35.0                 BADIER     65 HBC

                          52  XI*(1933) PARTIAL DECAY MODES

U52P1     XI*(1933) INTO XI PI                                  S22S 8
```

REFERENCES ON BARYON RESONANCES Concluded


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IDENTIFIC.  YR AUTHORS                        JOUR.VOL PAGE YR INSTITUTION     COD
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$Y_1^*(1765)$

```
                          45  Y*1 (1765,JP=5/2 )  I=1

GALTIERI    63 DBC  A BARBARO-GALTIERI +    PL      6  296 63 L R L            U45
FERRO-LUZZI 65 HBC  FERRO-LUZZI +           APS-WASHINGTON65 CERN+CHIC+HID+SAU45
YODH        65 HBC  YODH G B                PREPRINT  456 65 MARYLAND          U45

         QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS           U45

BERGE       65 HDBC BERGE,ELY,KALMUS +      UCRL.   16252 65 LRL        JP     U45
```

$Y_1^*(1942)$

```
                          46  Y*1 (1942,JP=  ) I=1

BOCK        65 HBC  BOCK,COOPER,FRENCH+     PL     17  166 65 CERN+SACLAY      U46
```

$Y_1^*(2070)$

```
                          47  Y*1 (2070,JP=  ) I=1

BLANPIED    65 CNTR BLANPIED,GREENBERG +    PRL    14  741 65 YALE             U47
WOHL        65 HBC  WOHL,SOLMITZ,STEVENSON  BAPS   10  529 65 L R L            U47
       ALSO 65 HBC  WOHL                    UCRL    16288 65 L R L             U47
BOCK        65 HBC  BOCK,COOPER,FRENCH+     PL     17  166 65 CERN+SACLAY      U47

         QUANTUM NUMBER DETERMINATIONS NOT REFERRED TO IN DATA CARDS           U47

STEVENSON   65 HBC  STEVENSON +             BOULDER CONF. 65 LRL        JP     U47
```

$\Xi^*(1530)$

```
                          49  XI* (1530,JP=3/2+)  I=1/2

BERTANZA    62 HBC  L BERTANZA +            PRL     9  180 62 BNL+SYR          U49
PJERROU     62 HBC  G M PJERROU +           PRL     9  114 62 UCLA             U49
CONNOLLY    63 HBC  P L CONNOLLY +          SIENA      125 63 BNL+SYR          U49
SCHLEIN     63 HBC  P E SCHLEIN +           PRL    11  167 63 UCLA             U49

LONDON      64 HBC  G W LONDON +            BAPS    9   22 64 BNL+SYR          U49
BADIER      64 HBC  J.BADIER +              DUBNA 64       64 EP+SACLAY+AMST   U49
PJERROU     65 HBC  PJERROU,SCHLEIN,SLATER+ PRL    14  275 65 UCLA             U49
```

$\Xi^*(1810)$

```
                          50  XI*(1810,JP=    )  I=1/2
HALSTEINSLID63 FBC  A HALSTEINSLID +        SIENA      173 63 BE+CE+EP+R+UC    U50
SMITH       64 HBC  G A SMITH +             PRL    13   61 64 L R L            U50
BADIER      64 HBC  J.BADIER +              DUBNA 64       64 EP+SACLAY+AMST   U50
SMITH       64 HBC  G.A.SMITH +             PRL    14   25 65 LRL              U50
BADIER      65 HBC  BADIER,DEMOULIN +       PL     16    1 65 EP+CEN+AMST      U50
SMITH       65 HBC  SMITH,LINDSEY           UCRL    16162 65 L R L             U50
```

$\Xi^*(1705)$

```
                          51  XI* (1705,JP=  ) I=1/2
SMITH       65 HBC  SMITH,LINDSEY           UCRL    16162 65 L R L             U51
```

$\Xi^*(1933)$

```
                          52  XI* (1933,JP=  ) I=1/2
BADIER      65 HBC  BADIER,DEMOULIN +       PL     16    1 65 EP+CEN+AMST      U52
```