



$$I(J^P) = 1(\frac{1}{2}^+) \text{ Status: } ***$$

We have omitted some results that have been superseded by later experiments. See our earlier editions.

NODE=S020

NODE=S020

Σ^- MASS

The fit uses Σ^+ , Σ^0 , Σ^- , and Λ mass and mass-difference measurements.

NODE=S020M

NODE=S020M

NODE=S020M

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1197.449±0.029 OUR FIT	Error includes scale factor of 1.1.			
1197.45 ±0.04 OUR AVERAGE	Error includes scale factor of 1.2.			
1197.417±0.040		GUREV	93	SPEC Σ^- C atom, crystal diff.
1197.532±0.057		GALL	88	CNTR Σ^- Pb, Σ^- W atoms
1197.43 ±0.08	3000	SCHMIDT	65	HBC See note with Λ mass
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1197.24 ±0.15		¹ DUGAN	75	CNTR Exotic atoms
¹ GALL 88 concludes that the DUGAN 75 mass needs to be reevaluated.				

NODE=S020M;LINKAGE=G

$m_{\Sigma^-} - m_{\Sigma^+}$

NODE=S020D

NODE=S020D

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
8.08±0.08 OUR FIT	Error includes scale factor of 1.9.			
8.09±0.16 OUR AVERAGE				
7.91±0.23	86	BOHM	72	EMUL
8.25±0.25	2500	DOSCH	65	HBC
8.25±0.40	87	BARKAS	63	EMUL

$m_{\Sigma^-} - m_{\Lambda}$

NODE=S020DL

NODE=S020DL

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
81.766±0.029 OUR FIT	Error includes scale factor of 1.1.			
81.69 ±0.07 OUR AVERAGE				
81.64 ±0.09	2279	HEPP	68	HBC
81.80 ±0.13	85	SCHMIDT	65	HBC See note with Λ mass
81.70 ±0.19		BURNSTEIN	64	HBC

Σ^- MEAN LIFE

NODE=S020T

NODE=S020T

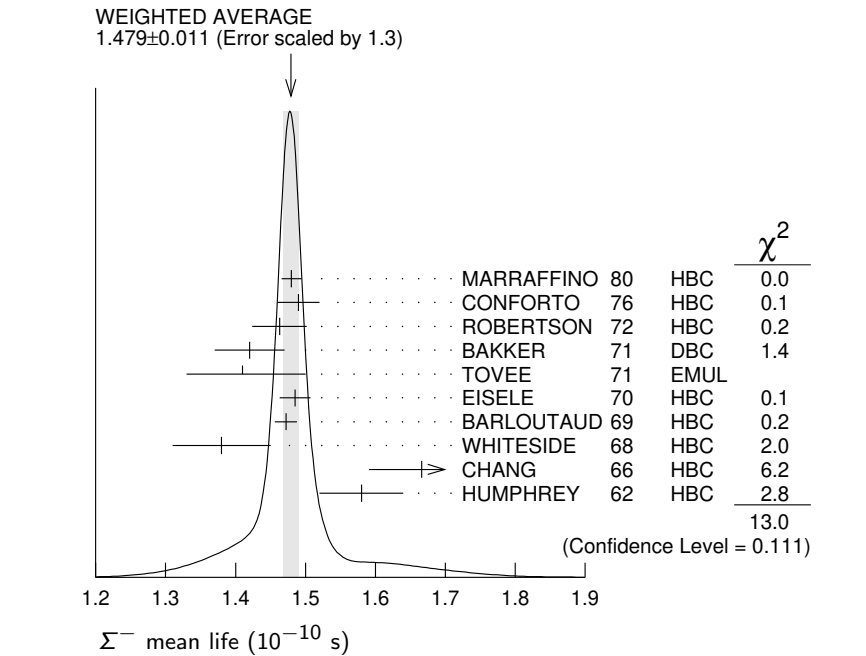
Measurements with an error $\geq 0.2 \times 10^{-10}$ s have been omitted.

NODE=S020T

VALUE (10^{-10} s)	EVTS	DOCUMENT ID	TECN	COMMENT
1.479±0.011 OUR AVERAGE	Error includes scale factor of 1.3. See the ideogram below.			
1.480±0.014	16k	MARRAFFINO	80	HBC $K^- p$ 0.42–0.5 GeV/c
1.49 ±0.03	8437	CONFORTO	76	HBC $K^- p$ 1–1.4 GeV/c
1.463±0.039	2400	ROBERTSON	72	HBC $K^- p$ 0.25 GeV/c
1.42 ±0.05	1383	BAKKER	71	DBC $K^- N \rightarrow \Sigma^- \pi \pi$
1.41 ^{+0.09} _{−0.08}		TOVEE	71	EMUL
1.485±0.022	100k	EISELE	70	HBC $K^- p$ at rest
1.472±0.016	10k	BARLOUTAUD	69	HBC $K^- p$ 0.4–1.2 GeV/c
1.38 ±0.07	506	WHITESIDE	68	HBC $K^- p$ at rest
1.666±0.075	3267	¹ CHANG	66	HBC $K^- p$ at rest
1.58 ±0.06	1208	HUMPHREY	62	HBC $K^- p$ at rest

¹ We have increased the CHANG 66 error of 0.026; see our 1970 edition, Reviews of Modern Physics **42** 87 (1970).

NODE=S020T;LINKAGE=C



Σ⁻ MAGNETIC MOMENT

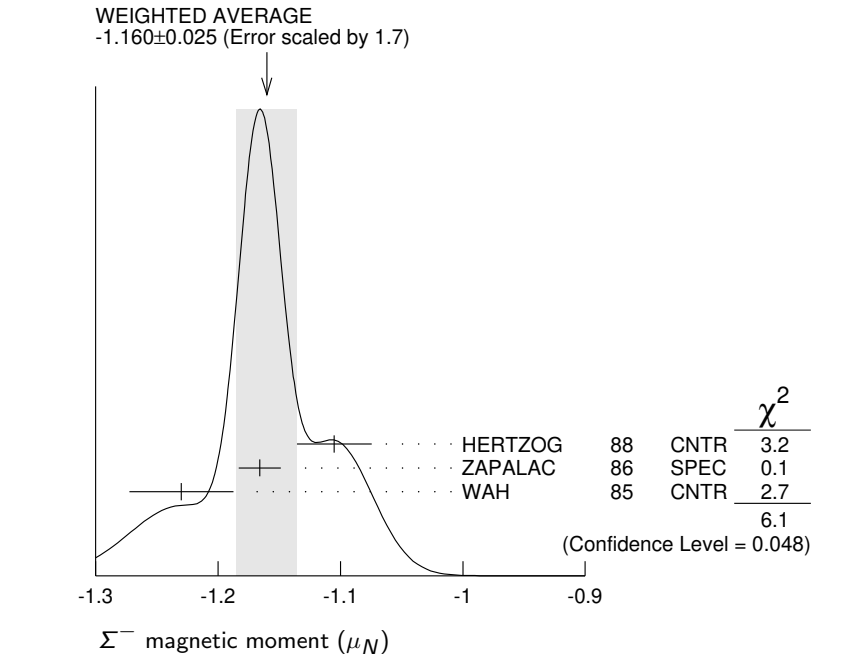
See the “Quark Model” review. Measurements with an error $\geq 0.3 \mu_N$ have been omitted.

NODE=S020MM

NODE=S020MM

NODE=S020MM

VALUE (μ_N)	EVTs	DOCUMENT ID	TECN	COMMENT
-1.160±0.025 OUR AVERAGE		Error includes scale factor of 1.7. See the ideogram below.		
-1.105±0.029±0.010		HERTZOG	88	CNTR Σ⁻ Pb, Σ⁻ W atoms
-1.166±0.014±0.010	671k	ZAPALAC	86	SPEC $n e^- \nu$, $n \pi^-$ decays
-1.23 ±0.03 ±0.03		WAH	85	CNTR $p \text{Cu} \rightarrow \Sigma^- X$
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●				
-0.89 ±0.14	516k	DECK	83	SPEC $p \text{Be} \rightarrow \Sigma^- X$



Σ⁻ CHARGE RADIUS

NODE=S020CR

NODE=S020CR

NODE=S020CR;LINKAGE=ES

VALUE (fm)	DOCUMENT ID	TECN	COMMENT
0.780±0.080±0.060	¹ ESCHRICH	01	SELX Σ⁻ e → Σ⁻ e
¹ ESCHRICH 01 actually gives $\langle r^2 \rangle = (0.61 \pm 0.12 \pm 0.09) \text{ fm}^2$.			

Σ^- DECAY MODES

NODE=S020230;NODE=S020

Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1 $n\pi^-$	(99.848 $\pm$ 0.005) %	
Γ_2 $n\pi^-\gamma$	[a] (4.6 $\pm$ 0.6) $\times 10^{-4}$	
Γ_3 $ne^-\bar{\nu}_e$	(1.017 $\pm$ 0.034) $\times 10^{-3}$	
Γ_4 $n\mu^-\bar{\nu}_\mu$	(4.5 $\pm$ 0.4) $\times 10^{-4}$	
Γ_5 $\Lambda e^-\bar{\nu}_e$	(5.73 $\pm$ 0.27) $\times 10^{-5}$	
Γ_6 $\Sigma^+ X$	< 1.2 $\times 10^{-4}$	90%

DESIG=1
DESIG=2
DESIG=4
DESIG=3
DESIG=5
DESIG=193

Lepton number (L) violating modes

Γ_7 pe^-e^-	L	< 6.7 $\times 10^{-5}$	90%
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NODE=S020;CLUMP=L
DESIG=192

[a] See the Listings below for the pion momentum range used in this measurement.

LINKAGE=SD

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 16 measurements and one constraint to determine 4 parameters. The overall fit has a $\chi^2 = 8.7$ for 13 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i/\Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

x_3	-64		
x_4	-77	0	
x_5	-5	0	0
	x_1	x_3	x_4

 Σ^- BRANCHING RATIOS

NODE=S020235

 $\Gamma(n\pi^-\gamma)/\Gamma(n\pi^-)$ **Γ_2/Γ_1**

The π^+ momentum cuts differ, so we do not average the results but simply use the latest value for the Summary Table.

NODE=S020R4
NODE=S020R4
NODE=S020R4

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
0.46$\pm$0.06	292	EBENHOH	73 HBC	$\pi^+ < 150$ MeV/ c
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.10 $\pm$ 0.02	23	ANG	69B HBC	$\pi^- < 110$ MeV/ c
~ 1.1		BAZIN	65B HBC	$\pi^- < 166$ MeV/ c

 $\Gamma(ne^-\bar{\nu}_e)/\Gamma(n\pi^-)$ **Γ_3/Γ_1**

Measurements with an error $\geq 0.2 \times 10^{-3}$ have been omitted.

NODE=S020R2
NODE=S020R2
NODE=S020R2

VALUE (units 10^{-3})	EVTS	DOCUMENT ID	TECN	COMMENT
1.019$\pm$0.035 OUR FIT				
1.019$^{+0.031}_{-0.040}$ OUR AVERAGE				
0.96 $\pm$ 0.05	2847	BOURQUIN	83C SPEC	SPS hyperon beam
1.09 $^{+0.06}_{-0.08}$	601	¹ EBENHOH	74 HBC	$K^- p$ at rest
1.05 $^{+0.07}_{-0.13}$	455	¹ SECHI-ZORN	73 HBC	$K^- p$ at rest
0.97 $\pm$ 0.15	57	COLE	71 HBC	$K^- p$ at rest
1.11 $\pm$ 0.09	180	BIERMAN	68 HBC	

¹ An additional negative systematic error is included for internal radiative corrections and latest form factors; see BOURQUIN 83C.

NODE=S020R2;LINKAGE=A

$\Gamma(n\mu^- \bar{\nu}_\mu)/\Gamma(n\pi^-)$ VALUE (units 10^{-3}) EVTS

DOCUMENT ID

TECN

COMMENT

 Γ_4/Γ_1 NODE=S020R1
NODE=S020R1**0.45±0.04 OUR FIT****0.45±0.04 OUR AVERAGE**

0.38±0.11	13	COLE	71	HBC	$K^- p$ at rest
0.43±0.06	72	ANG	69	HBC	$K^- p$ at rest
0.43±0.09	56	BAGGETT	69	HBC	$K^- p$ at rest
0.56±0.20	11	BAZIN	65B	HBC	$K^- p$ at rest
0.66±0.15	22	COURANT	64	HBC	

 $\Gamma(\Lambda e^- \bar{\nu}_e)/\Gamma(n\pi^-)$ VALUE (units 10^{-4}) EVTS

DOCUMENT ID

TECN

COMMENT

 Γ_5/Γ_1 NODE=S020R3
NODE=S020R3**0.574±0.027 OUR FIT****0.574±0.027 OUR AVERAGE**

0.561±0.031	1620	¹ BOURQUIN	82	SPEC	SPS hyperon beam
0.63 ±0.11	114	THOMPSON	80	ASPK	Hyperon beam
0.52 ±0.09	31	BALTAY	69	HBC	$K^- p$ at rest
0.69 ±0.12	31	EISELE	69	HBC	$K^- p$ at rest
0.64 ±0.12	35	BARASH	67	HBC	$K^- p$ at rest
0.75 ±0.28	11	COURANT	64	HBC	$K^- p$ at rest

¹ The value is from BOURQUIN 83B, and includes radiation corrections and new acceptance.

NODE=S020R3;LINKAGE=B

 $\Gamma(\Sigma^+ X)/\Gamma_{\text{total}}$

Here mode X can be any particle combination.

VALUE CL%

DOCUMENT ID

TECN

COMMENT

 Γ_6/Γ NODE=S020R01
NODE=S020R01
NODE=S020R01**<1.2 × 10⁻⁴** 90 ABLIKIM 21F BES 1,311 M J/ψ decays

Lepton number (L) violating modes

NODE=S020310

 $\Gamma(pe^- e^-)/\Gamma_{\text{total}}$ This decay violates lepton number conservation with $\Delta Q = \Delta L = 2$.

VALUE CL%

DOCUMENT ID

TECN

COMMENT

 Γ_7/Γ NODE=S020R00
NODE=S020R00
NODE=S020R00**<6.7 × 10⁻⁵** 90 ABLIKIM 21F BES 1,311 M J/ψ decays Σ^- DECAY PARAMETERS

NODE=S020240

See the "Note on Baryon Decay Parameters" in the neutron Listings.
Older, outdated results have been omitted.

NODE=S020240

 α_- FOR $\Sigma^- \rightarrow n\pi^-$

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

NODE=S020A-
NODE=S020A-**-0.068±0.008 OUR AVERAGE**

-0.062±0.024	28k	HANSL	78	HBC	$K^- p \rightarrow \Sigma^- \pi^+$
-0.067±0.011	60k	BOGERT	70	HBC	$K^- p$ 0.4 GeV/c
-0.071±0.012	51k	BANGERTER	69	HBC	$K^- p$ 0.4 GeV/c

 ϕ ANGLE FOR $\Sigma^- \rightarrow n\pi^-$ $(\tan\phi = \beta / \gamma)$

VALUE (°) EVTS

DOCUMENT ID

TECN

COMMENT

NODE=S020F-
NODE=S020F-**10±15 OUR AVERAGE**

+ 5±23	1092	¹ BERLEY	70B	HBC	n rescattering
14±19	1385	BANGERTER	69B	HBC	$K^- p$ 0.4 GeV/c

¹ BERLEY 70B changed from -5 to +5° to agree with our sign convention.

NODE=S020F-;LINKAGE=C

 g_A/g_V FOR $\Sigma^- \rightarrow ne^- \bar{\nu}_e$ Measurements with fewer than 500 events have been omitted. Where necessary, signs have been changed to agree with our conventions, which are given in the "Note on Baryon Decay Parameters" in the neutron Listings. What is actually listed is $|g_1/f_1 - 0.237g_2/f_1|$. This reduces to $g_A/g_V \equiv g_1(0)/f_1(0)$ on making the usual assumption that $g_2 = 0$. See also the note on HSUEH 88.NODE=S020AV2
NODE=S020AV2

VALUE EVTS

DOCUMENT ID

TECN

COMMENT

NODE=S020AV2

0.340±0.017 OUR AVERAGE

+0.327±0.007±0.019	50k	¹ HSUEH	88	SPEC	Σ^- 250 GeV
+0.34 ±0.05	4456	² BOURQUIN	83C	SPEC	SPS hyperon beam
0.385±0.037	3507	³ TANENBAUM	74	ASPK	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.29 ±0.07	25k	HSUEH	85	SPEC	See HSUEH 88
0.17 +0.07 -0.09	519	DECAMP	77	ELEC	Hyperon beam

¹ The sign is, *with our conventions*, unambiguously positive. The value assumes, as usual, that $g_2 = 0$. If g_2 is included in the fit, then (with our sign convention) $g_2 = -0.56 \pm 0.37$, with a corresponding reduction of g_A/g_V to $+0.20 \pm 0.08$.

² BOURQUIN 83C favors the positive sign by at least 2.6 standard deviations.

³ TANENBAUM 74 gives 0.435 ± 0.035 , assuming no q^2 dependence in g_A and g_V . The listed result allows q^2 dependence, and is taken from HSUEH 88.

$f_2(0)/f_1(0)$ FOR $\Sigma^- \rightarrow ne^- \bar{\nu}_e$

The signs have been changed to be in accord with our conventions, given in the "Note on Baryon Decay Parameters" in the neutron Listings.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.97±0.14 OUR AVERAGE				
+0.96±0.07±0.13	50k	HSUEH	88	SPEC Σ^- 250 GeV
+1.02±0.34	4456	BOURQUIN	83C	SPEC SPS hyperon beam

TRIPLE CORRELATION COEFFICIENT D for $\Sigma^- \rightarrow ne^- \bar{\nu}_e$

The coefficient D of the term $D \mathbf{P} \cdot (\hat{\mathbf{p}}_e \times \hat{\mathbf{p}}_{\nu})$ in the $\Sigma^- \rightarrow ne^- \bar{\nu}_e$ decay angular distribution. A nonzero value would indicate a violation of time-reversal invariance.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.11±0.10	50k	HSUEH	88	SPEC Σ^- 250 GeV

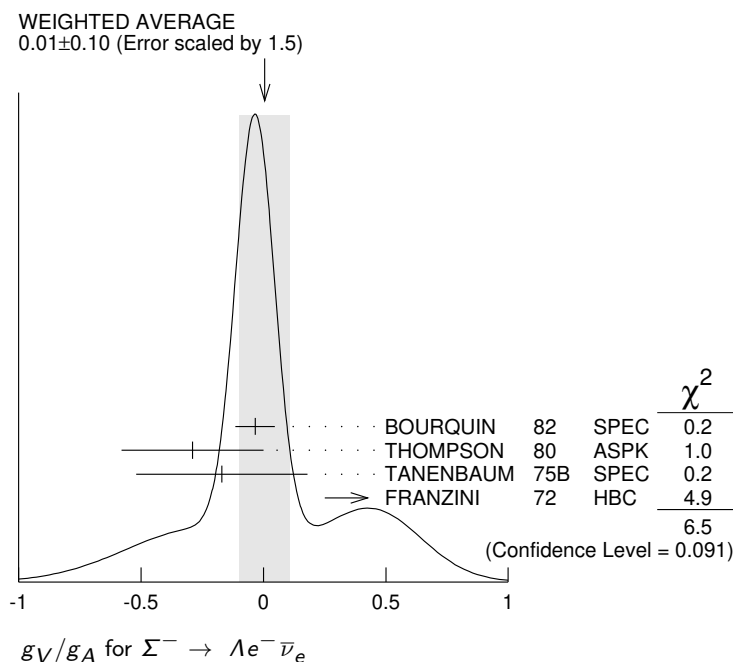
g_V/g_A FOR $\Sigma^- \rightarrow \Lambda e^- \bar{\nu}_e$

For the sign convention, see the "Note on Baryon Decay Parameters" in the neutron Listings. The value is predicted to be zero by conserved vector current theory. The values averaged assume CVC-SU(3) weak magnetism term.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
0.01 ±0.10 OUR AVERAGE Error includes scale factor of 1.5. See the ideogram below.				
−0.034±0.080	1620	¹ BOURQUIN	82	SPEC SPS hyperon beam
−0.29 ±0.29	114	THOMPSON	80	ASPK BNL hyperon beam
−0.17 ±0.35	55	TANENBAUM	75B	SPEC BNL hyperon beam
+0.45 ±0.20	186	^{1,2} FRANZINI	72	HBC

¹ The sign has been changed to agree with our convention.

² The FRANZINI 72 value includes the events of earlier papers.



g_{WM}/g_A FOR $\Sigma^- \rightarrow \Lambda e^- \bar{\nu}_e$

The values quoted assume the CVC prediction $g_V = 0$.

VALUE	EVTS	DOCUMENT ID	TECN	COMMENT
2.4 ±1.7 OUR AVERAGE				
1.75±3.5	114	THOMPSON	80	ASPK BNL hyperon beam
3.5 ±4.5	55	TANENBAUM	75B	SPEC BNL hyperon beam
2.4 ±2.1	186	FRANZINI	72	HBC

NODE=S020AV2;LINKAGE=A

NODE=S020AV2;LINKAGE=B

NODE=S020AV2;LINKAGE=C

NODE=S020F2

NODE=S020F2

NODE=S020F2

NODE=S020TC

NODE=S020TC

NODE=S020TC

NODE=S020AVM

NODE=S020AV

NODE=S020AV

NODE=S020AV

NODE=S020AV;LINKAGE=S

NODE=S020AV;LINKAGE=F

NODE=S020WM

NODE=S020WM

NODE=S020WM

Σ- REFERENCES

We have omitted some papers that have been superseded by later experiments. See our earlier editions.

NODE=S020

NODE=S020

ABLIKIM	21F	PR D103 052011	M. Ablikim <i>et al.</i>	(BESIII Collab.)	REFID=61046
ESCHRICH	01	PL B522 233	I. Eschrich <i>et al.</i>	(FNAL SELEX Collab.)	REFID=48455
GUREV	93	JETPL 57 400	M.P. Gurev <i>et al.</i>	(PNPI)	REFID=43326
		Translated from ZETFP 57 389.			
GALL	88	PRL 60 186	K.P. Gall <i>et al.</i>	(BOST, MIT, WILL, CIT+)	REFID=40289
HERTZOG	88	PR D37 1142	D.W. Hertzog <i>et al.</i>	(WILL, BOST, MIT+)	REFID=40290
HSUEH	88	PR D38 2056	S.Y. Hsueh <i>et al.</i>	(CHIC, ELMT, FNAL+)	REFID=41114
ZAPALAC	86	PRL 57 1526	G. Zapalac <i>et al.</i>	(EFI, ELMT, FNAL+)	REFID=12000
HSUEH	85	PRL 54 2399	S.Y. Hsueh <i>et al.</i>	(CHIC, ELMT, FNAL+)	REFID=11998
WAH	85	PRL 55 2551	Y.W. Wah <i>et al.</i>	(FNAL, IOWA, ISU)	REFID=11999
BOURQUIN	83B	ZPHY C21 27	M.H. Bourquin <i>et al.</i>	(BRIS, GEVA, HEIDP+)	REFID=11992
BOURQUIN	83C	ZPHY C21 17	M.H. Bourquin <i>et al.</i>	(BRIS, GEVA, HEIDP+)	REFID=11994
DECK	83	PR D28 1	L. Deck <i>et al.</i>	(RUTG, WISC, MICH, MINN)	REFID=11996
BOURQUIN	82	ZPHY C12 307	M.H. Bourquin <i>et al.</i>	(BRIS, GEVA, HEIDP+)	REFID=11991
MARRAFFINO	80	PR D21 2501	J. Marraffino <i>et al.</i>	(VAND, MPIM)	REFID=11906
THOMPSON	80	PR D21 25	J.A. Thompson <i>et al.</i>	(PITT, BNL)	REFID=11990
HANSL	78	NP B132 45	T. Hansl <i>et al.</i>	(MPIM, VAND)	REFID=11987
DECAMP	77	PL 66B 295	D. Decamp <i>et al.</i>	(LALO, EPOL)	REFID=11986
CONFORTO	76	NP B105 189	B. Conforto <i>et al.</i>	(RHEL, LOIC)	REFID=11900
DUGAN	75	NP A254 396	G. Dugan <i>et al.</i>	(COLU, YALE)	REFID=11983
TANENBAUM	75B	PR D12 1871	W. Tanenbaum <i>et al.</i>	(YALE, FNAL, BNL)	REFID=11982
EBENHOH	74	ZPHY 266 367	H. Ebenhoh <i>et al.</i>	(HEIDT)	REFID=11899
TANENBAUM	74	PRL 33 175	W. Tanenbaum <i>et al.</i>	(YALE, FNAL, BNL)	REFID=11981
EBENHOH	73	ZPHY 264 413	W. Ebenhoh <i>et al.</i>	(HEIDT)	REFID=11895
SECHI-ZORN	73	PR D8 12	B. Sechi-Zorn, G.A. Snow	(UMD)	REFID=11898
BOHM	72	NP B48 1	G. Bohm <i>et al.</i>	(BERL, KIDR, BRUX, IASD+)	REFID=11893
FRANZINI	72	PR D6 2417	P. Franzini <i>et al.</i>	(COLU, HEID, UMD+)	REFID=11972
ROBERTSON	72	Thesis UMI 78-00877	R.M. Robertson	(IIT)	REFID=11973
BAKKER	71	LNC 1 37	A.M. Bakker <i>et al.</i>	(SABRE Collab.)	REFID=11889
COLE	71	PR D4 631	J. Cole <i>et al.</i>	(STON, COLU)	REFID=11890
Also		Thesis Nevis 175	H. Norton	(COLU)	REFID=11967
TOVEE	71	NP B33 493	D.N. Tovee <i>et al.</i>	(LOUC, KIDR, BERL+)	REFID=11891
BERLEY	70B	PR D1 2015	D. Berley <i>et al.</i>	(BNL, MASA, YALE)	REFID=11885
BOGERT	70	PR D2 6	D.V. Bogert <i>et al.</i>	(BNL, MASA, YALE)	REFID=11963
EISELE	70	ZPHY 238 372	F. Eisele <i>et al.</i>	(HEID)	REFID=11886
PDG	70	RMP 42 87	A. Barbaro-Galtieri <i>et al.</i>	(LRL, BRAN+)	REFID=41173
ANG	69	ZPHY 223 103	G. Ang <i>et al.</i>	(HEID)	REFID=11951
ANG	69B	ZPHY 228 151	G. Ang <i>et al.</i>	(HEID)	REFID=11952
BAGGETT	69	PRL 23 249	N.V. Baggett, B. Kehoe, G.A. Snow	(UMD)	REFID=11953
BALTAY	69	PRL 22 615	C. Baltay <i>et al.</i>	(COLU, STON)	REFID=11876
BANGERTER	69	Thesis UCRL 19244	R.O. Bangerter	(LRL)	REFID=11877
BANGERTER	69B	PR 187 1821	R.O. Bangerter <i>et al.</i>	(LRL)	REFID=11878
BARLOUTAUD	69	NP B14 153	R. Barloutaud <i>et al.</i>	(SACL, CERN, HEID)	REFID=11879
EISELE	69	ZPHY 221 1	F. Eisele <i>et al.</i>	(HEID)	REFID=11880
BIERMAN	68	PRL 20 1459	E. Bierman <i>et al.</i>	(PRIN)	REFID=11871
HEPP	68	ZPHY 214 71	V. Hepp, H. Schleich	(HEID)	REFID=11781
WHITESIDE	68	NC 54A 537	H. Whiteside, J. Gollub	(OBER)	REFID=11950
BARASH	67	PRL 19 181	N. Barash <i>et al.</i>	(UMD)	REFID=11865
CHANG	66	PR 151 1081	C.Y. Chang	(COLU)	REFID=11940
BAZIN	65B	PR 140 B1358	M. Bazin <i>et al.</i>	(PRIN, RUTG, COLU)	REFID=11938
DOSCH	65	PL 14 239	H.C. Dosch <i>et al.</i>	(HEID)	REFID=11917
Also		PR 151 1081	C.Y. Chang	(COLU)	REFID=11940
SCHMIDT	65	PR 140 B1328	P. Schmidt	(COLU)	REFID=11768
BURNSTEIN	64	PRL 13 66	R.A. Burnstein <i>et al.</i>	(UMD)	REFID=11916
COURANT	64	PR 136 B1791	H. Courant <i>et al.</i>	(CERN, HEID, UMD+)	REFID=11846
BARKAS	63	PRL 11 26	W.H. Barkas, J.N. Dyer, H.H. Heckman	(LRL)	REFID=10865
HUMPHREY	62	PR 127 1305	W.E. Humphrey, R.R. Ross	(LRL)	REFID=11743