NODE=B048

$\Sigma(2250)$

$I(J^P) = 1(?^?)$ Status: $**$

OMITTED FROM SUMMARY TABLE

NODE=B048

Results from partial-wave analyses are too weak to warrant separating them from the production and cross-section experiments. LASINSKI 71 in $\overline{K}N$ using a Pomeron + resonances model, and DEBELLEFON 76, DEBELLEFON 77, and DEBELLEFON 78 in energy-dependent partial-wave analyses of $\overline{K}N \rightarrow \Lambda\pi$, $\Sigma\pi$, and $N\overline{K}$, respectively, suggest two resonances around this mass.

$\Sigma(2250)$ MASS

NODE=B048M

NODE=B048M

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT	
2210 to 2280 (≈ 2250) OUR ESTIMATE					→ UNCHECKED ←
2270±50	DEBELLEFON	78	DPWA	D_5 wave	
2210±30	DEBELLEFON	78	DPWA	G_9 wave	OCCUR=2
2275±20	DEBELLEFON	77	DPWA	D_5 wave	
2215±20	DEBELLEFON	77	DPWA	G_9 wave	OCCUR=2
2300±30	[1] DEBELLEFON	75B	HBC	$K^- p \rightarrow \Xi^{*0} K^0$	
2251^{+30}_{-20}	VANHORN	75	DPWA	$K^- p \rightarrow \Lambda\pi^0$, F_5 wave	
2280±14	AGUILAR-...	70B	HBC	$K^- p$ 3.9, 4.6 GeV/c	
2237±11	BRICMAN	70	CNTR	Total, charge exchange	
2255±10	COOL	70	CNTR	$K^- p$, $K^- d$ total	
2250± 7	BUGG	68	CNTR	$K^- p$, $K^- d$ total	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
2260	DEBELLEFON	76	IPWA	D_5 wave	
2215	DEBELLEFON	76	IPWA	G_9 wave	OCCUR=2
2250±20	LU	70	CNTR	$\gamma p \rightarrow K^+ Y^*$	
2245	BLANPIED	65	CNTR	$\gamma p \rightarrow K^+ Y^*$	
2299± 6	BOCK	65	HBC	$\overline{p}p$ 5.7 GeV/c	

$\Sigma(2250)$ WIDTH

NODE=B048W

NODE=B048W

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT	
60 to 150 (≈ 100) OUR ESTIMATE					→ UNCHECKED ←
120±40	DEBELLEFON	78	DPWA	D_5 wave	
80±20	DEBELLEFON	78	DPWA	G_9 wave	OCCUR=2
70±20	DEBELLEFON	77	DPWA	D_5 wave	
60±20	DEBELLEFON	77	DPWA	G_9 wave	OCCUR=2
130±20	[1] DEBELLEFON	75B	HBC	$K^- p \rightarrow \Xi^{*0} K^0$	
192±30	VANHORN	75	DPWA	$K^- p \rightarrow \Lambda\pi^0$, F_5 wave	
100±20	AGUILAR-...	70B	HBC	$K^- p$ 3.9, 4.6 GeV/c	
164±50	BRICMAN	70	CNTR	Total, charge exchange	
230±20	BUGG	68	CNTR	$K^- p$, $K^- d$ total	
• • • We do not use the following data for averages, fits, limits, etc. • • •					
100	DEBELLEFON	76	IPWA	D_5 wave	
140	DEBELLEFON	76	IPWA	G_9 wave	OCCUR=2
170	COOL	70	CNTR	$K^- p$, $K^- d$ total	
125	LU	70	CNTR	$\gamma p \rightarrow K^+ Y^*$	
150	BLANPIED	65	CNTR	$\gamma p \rightarrow K^+ Y^*$	
21^{+17}_{-21}	BOCK	65	HBC	$\overline{p}p$ 5.7 GeV/c	

$\Sigma(2250)$ DECAY MODES

NODE=B048215;NODE=B048

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$N\overline{K}$	<10 %	DESIG=1;OUR EST
Γ_2	$\Lambda\pi$	seen	DESIG=2;OUR EST
Γ_3	$\Sigma\pi$	seen	DESIG=3;OUR EST
Γ_4	$\Xi(1530)K$		DESIG=5

$\Sigma(2250)$ BRANCHING RATIOS

NODE=B048220

See "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances.

NODE=B048220

$\Gamma(N\overline{K})/\Gamma_{total}$ — Γ_1/Γ

NODE=B048R1

VALUE	DOCUMENT ID	TECN	COMMENT
<0.1 OUR ESTIMATE			
0.08±0.02	DEBELLEFON 78	DPWA	D_5 wave
0.02±0.01	DEBELLEFON 78	DPWA	G_9 wave

NODE=B048R1 → UNCHECKED ← OCCUR=2

$(J+\frac{1}{2})\times\Gamma(N\overline{K})/\Gamma_{total}$ — Γ_1/Γ

NODE=B048R7

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.16±0.12	BRICMAN 70	CNTR	Total, charge exchange
0.42	COOL 70	CNTR	$K^- p$, $K^- d$ total
0.47	BUGG 68	CNTR	

NODE=B048R7

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2250) \to \Lambda\pi$ — $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

NODE=B048R2

VALUE	DOCUMENT ID	TECN	COMMENT
−0.16±0.03	VANHORN 75	DPWA	$K^- p \to \Lambda\pi^0$, F_5 wave
• • • We do not use the following data for averages, fits, limits, etc. • • •			
+0.11	DEBELLEFON 76	IPWA	D_5 wave
−0.10	DEBELLEFON 76	IPWA	G_9 wave
−0.18	BARBARO-... 70	DPWA	$K^- p \to \Lambda\pi^0$, G_9 wave

NODE=B048R2 OCCUR=2

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2250) \to \Sigma\pi$ — $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

NODE=B048R3

VALUE	DOCUMENT ID	TECN	COMMENT
+0.06±0.02	DEBELLEFON 77	DPWA	D_5 wave
−0.03±0.02	DEBELLEFON 77	DPWA	G_9 wave
+0.07	BARBARO-... 70	DPWA	$K^- p \to \Sigma\pi$, G_9 wave

NODE=B048R3 OCCUR=2

$\Gamma(N\overline{K})/\Gamma(\Sigma\pi)$ — Γ_1/Γ_3

NODE=B048R4

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
<0.18	BARNES 69	HBC	1 standard dev. limit

NODE=B048R4

$\Gamma(\Lambda\pi)/\Gamma(\Sigma\pi)$ — Γ_2/Γ_3

NODE=B048R5

VALUE	DOCUMENT ID	TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •			
<0.18	BARNES 69	HBC	1 standard dev. limit

NODE=B048R5

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(2250) \to \Xi(1530)K$ — $(\Gamma_1\Gamma_4)^{1/2}/\Gamma$

NODE=B048R6

VALUE	DOCUMENT ID	TECN	COMMENT
0.18±0.04	[1] DEBELLEFON 75B	HBC	$K^- p \to \Xi^{*0} K^0$

NODE=B048R6

$\Sigma(2250)$ FOOTNOTES

NODE=B048

[1] Seen in the (initial and final state) D_5 wave. Isospin not determined.

NODE=B048;LINKAGE=B

$\Sigma(2250)$ REFERENCES

NODE=B048

DEBELLEFON	78	NC 42A 403	A. de Bellefon *et al.*	(CDEF, SACL) IJP	REFID=31968
DEBELLEFON	77	NC 37A 175	A. de Bellefon *et al.*	(CDEF, SACL) IJP	REFID=31985
DEBELLEFON	76	NP B109 129	A. de Bellefon, A. Berthon	(CDEF) IJP	REFID=32158
Also		NP B90 1	A. de Bellefon *et al.*	(CDEF, SACL) IJP	REFID=32425
DEBELLEFON	75B	NC 28A 289	A. de Bellefon *et al.*	(CDEF, SACL)	REFID=32003
VANHORN	75	NP B87 145	A.J. van Horn	(LBL) IJP	REFID=32093
Also		NP B87 157	A.J. van Horn	(LBL) IJP	REFID=32094
LASINSKI	71	NP B29 125	T.A. Lasinski	(EFI) IJP	REFID=32002
AGUILAR-...	70B	PRL 25 58	M. Aguilar-Benitez *et al.*	(BNL, SYRA)	REFID=20692
BARBARO-...	70	Duke Conf. 173 Hyperon Resonances, 1970	A. Barbaro-Galtieri	(LRL) IJP	REFID=31777
BRICMAN	70	PL 31B 152	C. Bricman *et al.*	(CERN, CAEN, SACL)	REFID=31872
COOL	70	PR D1 1887	R.L. Cool *et al.*	(BNL) I	REFID=31529
Also		PRL 16 1228	R.L. Cool *et al.*	(BNL) I	REFID=31861
LU	70	PR D2 1846	D.C. Lu *et al.*	(YALE)	REFID=31978
BARNES	69	PRL 22 479	V.E. Barnes *et al.*	(BNL, SYRA)	REFID=32340
BUGG	68	PR 168 1466	D.V. Bugg *et al.*	(RHEL, BIRM, CAVE) I	REFID=31601
BLANPIED	65	PRL 14 741	W.A. Blanpied *et al.*	(YALE, CEA)	REFID=32413
BOCK	65	PL 17 166	R.K. Bock *et al.*	(CERN, SACL)	REFID=31971