

$\Sigma(1620) 1/2^-$ $I(J^P) = 1(\frac{1}{2}^-)$ Status: *

OMITTED FROM SUMMARY TABLE

The S_{11} state at 1697 MeV reported by VANHORN 75 is tentatively listed under the $\Sigma(1750)$. CARROLL 76 sees two bumps in the isospin-1 total cross section near this mass. GAO 12 sees no evidence for this resonance.

Production experiments are listed separately in the next entry.

 $\Sigma(1620)$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
≈ 1620 OUR ESTIMATE			
1600 ± 15	ZHANG	13A	DPWA Multichannel
1600 ± 6	¹ MORRIS	78	DPWA $K^- n \rightarrow \Lambda \pi^-$
1608 ± 5	² CARROLL	76	DPWA Isospin-1 total σ
1633 ± 10	³ CARROLL	76	DPWA Isospin-1 total σ
1630 ± 10	LANGBEIN	72	IPWA $\bar{K}N$ multichannel
1620	KIM	71	DPWA K-matrix analysis

 $\Sigma(1620)$ WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
400 ± 152	ZHANG	13A	DPWA Multichannel
87 ± 19	¹ MORRIS	78	DPWA $K^- n \rightarrow \Lambda \pi^-$
15	² CARROLL	76	DPWA Isospin-1 total σ
10	³ CARROLL	76	DPWA Isospin-1 total σ
65 ± 20	LANGBEIN	72	IPWA $\bar{K}N$ multichannel
40	KIM	71	DPWA K-matrix analysis

 $\Sigma(1620)$ POLE POSITION**REAL PART**

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
1501	ZHANG	13A	DPWA Multichannel

-2×IMAGINARY PART

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●			
171	ZHANG	13A	DPWA Multichannel

Σ(1620) DECAY MODES

Mode
Γ ₁ $N\bar{K}$
Γ ₂ $\Lambda\pi$
Γ ₃ $\Sigma\pi$

Σ(1620) BRANCHING RATIOS

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$	Γ_1/Γ
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
0.59±0.10	ZHANG 13A DPWA Multichannel
0.22±0.02	LANGBEIN 72 IPWA $\bar{K}N$ multichannel
0.05	KIM 71 DPWA K-matrix analysis

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(1620) \rightarrow \Lambda\pi$	$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
0.12±0.02	¹ MORRIS 78 DPWA $K^-n \rightarrow \Lambda\pi^-$
not seen	BAILLON 75 IPWA $\bar{K}N \rightarrow \Lambda\pi$
0.15	KIM 71 DPWA K-matrix analysis

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(1620) \rightarrow \Sigma\pi$	$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$
<u>VALUE</u>	<u>DOCUMENT ID</u> <u>TECN</u> <u>COMMENT</u>
+0.32±0.03	ZHANG 13A DPWA Multichannel
not seen	HEPP 76B DPWA $K^-N \rightarrow \Sigma\pi$
+0.40±0.06	LANGBEIN 72 IPWA $\bar{K}N$ multichannel
+0.08	KIM 71 DPWA K-matrix analysis

Σ(1620) FOOTNOTES

- ¹ MORRIS 78 obtains an equally good fit without including this resonance.
² Total cross-section bump with $(J+1/2) \Gamma_{\text{el}} / \Gamma_{\text{total}}$ is 0.06 seen by CARROLL 76.
³ Total cross-section bump with $(J+1/2) \Gamma_{\text{el}} / \Gamma_{\text{total}}$ is 0.04 seen by CARROLL 76.

Σ(1620) REFERENCES

ZHANG 13A PR C88 035205	H. Zhang <i>et al.</i>	(KSU)
GAO 12 PR C86 025201	P. Gao, J. Shi, B.S. Zou	(BHEP, BEIJT)
Also	P. Gao, B.S. Zou, A. Sibirtsev	(BHEP, BEIJT+)
MORRIS 78 PR D17 55	W.A. Morris <i>et al.</i>	(FSU) IJP
CARROLL 76 PRL 37 806	A.S. Carroll <i>et al.</i>	(BNL) I
HEPP 76B PL 65B 487	V. Hepp <i>et al.</i>	(CERN, HEIDH, MPIM) IJP
BAILLON 75 NP B94 39	P.H. Baillon, P.J. Litchfield	(CERN, RHEL) IJP
VANHORN 75 NP B87 145	A.J. van Horn	(LBL) IJP
Also	A.J. van Horn	(LBL) IJP
LANGBEIN 72 NP B47 477	W. Langbein, F. Wagner	(MPIM) IJP
KIM 71 PRL 27 356	J.K. Kim	(HARV) IJP
Also	J.K. Kim	(HARV) IJP
Hyperon Resonances, 1970		