

Σ(1620) S₁₁

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

OMITTED FROM SUMMARY TABLE

The S₁₁ state at 1697 MeV reported by VANHORN 75 is tentatively listed under the Σ(1750). CARROLL 76 sees two bumps in the isospin-1 total cross section near this mass.

Production experiments are listed separately in the next entry.

Σ(1620) MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
≈ 1620 OUR ESTIMATE			
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

Σ(1620) WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
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

Σ(1620) DECAY MODES

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

Σ(1620) BRANCHING RATIOS

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	COMMENT	Γ ₁ /Γ
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 $N\bar{K} \rightarrow \Sigma(1620) \rightarrow \Lambda\pi$	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$
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 $N\bar{K} \rightarrow \Sigma(1620) \rightarrow \Sigma\pi$				$(\Gamma_1 \Gamma_3)^{1/2} / \Gamma$
VALUE	DOCUMENT ID	TECN	COMMENT	
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

$\Sigma(1620)$ 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.

$\Sigma(1620)$ REFERENCES

MORRIS	78	PR D17 55	+Albright, Colleraine, Kimel, Lannutti	(FSU) IJP
CARROLL	76	PRL 37 806	+Chiang, Kycia, Li, Mazur, Michael+	(BNL) I
HEPP	76B	PL 65B 487	+Braun, Grimm, Strobele+	(CERN, HEIDH, MPIM) IJP
BAILLON	75	NP B94 39	+Litchfield	(CERN, RHEL) IJP
VANHORN	75	NP B87 145		(LBL) IJP
Also	75B	NP B87 157	VanHorn	(LBL) IJP
LANGBEIN	72	NP B47 477	+Wagner	(MPIM) IJP
KIM	71	PRL 27 356		(HARV) IJP
Also	70	Duke Conf. 161	Kim	(HARV) IJP