# $\Sigma(1620)$ $S_{11}$

$I(J^P) = 1(\frac{1}{2}^-)$ 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.

Production experiments are listed separately in the next entry.

## $\Sigma(1620)$ MASS

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| **≈ 1620 OUR ESTIMATE** | | | | |
| 1600± 6 | [1] MORRIS | 78 | DPWA | $K^- n \to \Lambda\pi^-$ |
| 1608± 5 | [2] CARROLL | 76 | DPWA | Isospin-1 total $\sigma$ |
| 1633±10 | [3] CARROLL | 76 | DPWA | Isospin-1 total $\sigma$ |
| 1630±10 | LANGBEIN | 72 | IPWA | $\overline{K}N$ multichannel |
| 1620 | KIM | 71 | DPWA | K-matrix analysis |

## $\Sigma(1620)$ WIDTH

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 87±19 | [1] MORRIS | 78 | DPWA | $K^- n \to \Lambda\pi^-$ |
| 15 | [2] CARROLL | 76 | DPWA | Isospin-1 total $\sigma$ |
| 10 | [3] CARROLL | 76 | DPWA | Isospin-1 total $\sigma$ |
| 65±20 | LANGBEIN | 72 | IPWA | $\overline{K}N$ multichannel |
| 40 | KIM | 71 | DPWA | K-matrix analysis |

## $\Sigma(1620)$ DECAY MODES

| | Mode |
|---|---|
| $\Gamma_1$ | $N\overline{K}$ |
| $\Gamma_2$ | $\Lambda\pi$ |
| $\Gamma_3$ | $\Sigma\pi$ |

## $\Sigma(1620)$ BRANCHING RATIOS

### $\Gamma(N\overline{K})/\Gamma_{total}$ $\Gamma_1/\Gamma$

| *VALUE* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 0.22±0.02 | LANGBEIN | 72 | IPWA | $\overline{K}N$ multichannel |
| 0.05 | KIM | 71 | DPWA | K-matrix analysis |

### $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1620) \to \Lambda\pi$ $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$

| *VALUE* | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| 0.12±0.02 | [1] MORRIS | 78 | DPWA | $K^- n \to \Lambda\pi^-$ |
| not seen | BAILLON | 75 | IPWA | $\overline{K}N \to \Lambda\pi$ |
| 0.15 | KIM | 71 | DPWA | K-matrix analysis |

$(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{total}$ in $N\overline{K} \to \Sigma(1620) \to \Sigma\pi$ $(\Gamma_1\Gamma_3)^{1/2}/\Gamma$

| VALUE | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| not seen | HEPP | 76B | DPWA | $K^- N \to \Sigma\pi$ |
| $0.40 \pm 0.06$ | LANGBEIN | 72 | IPWA | $\overline{K}N$ 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 $(J+1/2)\ \Gamma_{el}\ /\ \Gamma_{total}$ is 0.06 seen by CARROLL 76.
[3] Total cross-section bump with $(J+1/2)\ \Gamma_{el}\ /\ \Gamma_{total}$ 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 |