

# $\Sigma(2000) S_{11}$

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

OMITTED FROM SUMMARY TABLE

We list here all reported  $S_{11}$  states lying above the  $\Sigma(1750) S_{11}$ .

## $\Sigma(2000)$ MASS

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
<b><math>\approx 2000</math> OUR ESTIMATE</b>			
1944 ± 15	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
1955 ± 15	GOPAL	77	DPWA $\bar{K}N$ multichannel
1755 or 1834	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
2004 ± 40	VANHORN	75	DPWA $K^- p \rightarrow \Lambda\pi^0$

## $\Sigma(2000)$ WIDTH

<u>VALUE (MeV)</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
215 ± 25	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
170 ± 40	GOPAL	77	DPWA $\bar{K}N$ multichannel
413 or 450	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
116 ± 40	VANHORN	75	DPWA $K^- p \rightarrow \Lambda\pi^0$

## $\Sigma(2000)$ DECAY MODES

Mode
$\Gamma_1$ $N\bar{K}$
$\Gamma_2$ $\Lambda\pi$
$\Gamma_3$ $\Sigma\pi$
$\Gamma_4$ $\Lambda(1520)\pi$
$\Gamma_5$ $N\bar{K}^*(892)$ , $S=1/2$ , $S$ -wave
$\Gamma_6$ $N\bar{K}^*(892)$ , $S=3/2$ , $D$ -wave

## $\Sigma(2000)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on  $\Lambda$  and  $\Sigma$  Resonances.

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$	$\Gamma_1/\Gamma$		
<u>VALUE</u>	<u>DOCUMENT ID</u>	<u>TECN</u>	<u>COMMENT</u>
0.51 ± 0.05	GOPAL	80	DPWA $\bar{K}N \rightarrow \bar{K}N$
0.44 ± 0.05	GOPAL	77	DPWA See GOPAL 80
0.62 or 0.57	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Lambda\pi$	$(\Gamma_1 \Gamma_2)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$0.08 \pm 0.03$	GOPAL	77	DPWA $\bar{K}N$ multichannel
$-0.19$ or $-0.18$	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel
not seen	BAILLON	75	IPWA $\bar{K}N \rightarrow \Lambda\pi$
$+0.07^{+0.02}_{-0.01}$	VANHORN	75	DPWA $K^- p \rightarrow \Lambda\pi^0$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Sigma\pi$	$(\Gamma_1 \Gamma_3)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$+0.20 \pm 0.04$	GOPAL	77	DPWA $\bar{K}N$ multichannel
$+0.26$ or $+0.24$	<sup>1</sup> MARTIN	77	DPWA $\bar{K}N$ multichannel

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow \Lambda(1520)\pi$	$(\Gamma_1 \Gamma_4)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$+0.081 \pm 0.021$	<sup>2</sup> CAMERON	77	DPWA $P$ -wave decay

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow N\bar{K}^*(892), S=1/2, S\text{-wave}$	$(\Gamma_1 \Gamma_5)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$+0.10 \pm 0.02$	<sup>2</sup> CAMERON	78B	DPWA $K^- p \rightarrow N\bar{K}^*$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2000) \rightarrow N\bar{K}^*(892), S=3/2, D\text{-wave}$	$(\Gamma_1 \Gamma_6)^{1/2} / \Gamma$		
VALUE	DOCUMENT ID	TECN	COMMENT
$-0.07 \pm 0.03$	CAMERON	78B	DPWA $K^- p \rightarrow N\bar{K}^*$

### $\Sigma(2000)$ FOOTNOTES

- <sup>1</sup> The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.  
<sup>2</sup> The published sign has been changed to be in accord with the baryon-first convention.

### $\Sigma(2000)$ REFERENCES

GOPAL	80	Toronto Conf.	159	G.P. Gopal	(RHEL) IJP
CAMERON	78B	NP B146	327	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
CAMERON	77	NP B131	399	W. Cameron <i>et al.</i>	(RHEL, LOIC) IJP
GOPAL	77	NP B119	362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
MARTIN	77	NP B127	349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP
Also	77B	NP B126	266	B.R. Martin, M.K. Pidcock	(LOUC)
Also	77C	NP B126	285	B.R. Martin, M.K. Pidcock	(LOUC) 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	75B	NP B87	157	A.J. van Horn	(LBL) IJP