

$\Sigma(2100) \ 7/2^-$

$I(J^P) = 1(\frac{7}{2}^-)$  Status: \*

OMITTED FROM SUMMARY TABLE

$\Sigma(2100)$  POLE POSITION

REAL PART

| <u>VALUE (MeV)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|--------------------|--------------------|-------------|-------------------------------|
| <b>2093±16</b>     | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

−2×IMAGINARY PART

| <u>VALUE (MeV)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|--------------------|--------------------|-------------|-------------------------------|
| <b>210±35</b>      | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

$\Sigma(2100)$  POLE RESIDUES

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow N\overline{K}$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.09±0.02</b> | <b>−110 ± 15</b> | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Sigma \pi$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.04±0.02</b> | <b>−50 ± 20</b>  | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Lambda \pi$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.03±0.02</b> | <b>−100 ± 25</b> | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Xi K$

| <u>MODULUS</u>     | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|--------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.010±0.005</b> | <b>−120 ± 35</b> | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Lambda(1520)\pi, F\text{-wave}$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.02±0.01</b> | <b>−100 ± 30</b> | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Lambda(1520)\pi, H\text{-wave}$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.01±0.01</b> |                  | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Sigma(1385)\pi, D\text{-wave}$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.10±0.03</b> | <b>−60 ± 30</b>  | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\overline{K} \rightarrow \Sigma(2100) \rightarrow \Sigma(1385)\pi, G\text{-wave}$

| <u>MODULUS</u>   | <u>PHASE (°)</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u>                |
|------------------|------------------|--------------------|-------------|-------------------------------|
| <b>0.03±0.01</b> | <b>−50 ± 30</b>  | SARANTSEV 19       | DPWA        | $\overline{K} N$ multichannel |

Normalized residue in  $N\bar{K} \rightarrow \Sigma(2100) \rightarrow \Delta\bar{K}$ , G-wave

| <i>MODULUS</i>   | <i>PHASE (°)</i> | <i>DOCUMENT ID</i> | <i>TECN</i> | <i>COMMENT</i>          |
|------------------|------------------|--------------------|-------------|-------------------------|
| <b>0.04±0.02</b> | <b>75 ± 35</b>   | SARANTSEV 19       | DPWA        | $\bar{K}N$ multichannel |

Normalized residue in  $N\bar{K} \rightarrow \Sigma(2100) \rightarrow N\bar{K}^*(892)$ , S=3/2, D-wave

| <i>MODULUS</i>   | <i>PHASE (°)</i> | <i>DOCUMENT ID</i> | <i>TECN</i> | <i>COMMENT</i>          |
|------------------|------------------|--------------------|-------------|-------------------------|
| <b>0.08±0.04</b> | <b>20 ± 50</b>   | SARANTSEV 19       | DPWA        | $\bar{K}N$ multichannel |

$\Sigma(2100)$  MASS

| <i>VALUE (MeV)</i>         | <i>DOCUMENT ID</i> | <i>TECN</i> | <i>COMMENT</i>                       |
|----------------------------|--------------------|-------------|--------------------------------------|
| <b>≈ 2100 OUR ESTIMATE</b> |                    |             |                                      |
| 2146±17                    | SARANTSEV 19       | DPWA        | $\bar{K}N$ multichannel              |
| 2060±20                    | BARBARO-...        | 70          | DPWA $K^-p \rightarrow \Lambda\pi^0$ |
| 2120±30                    | BARBARO-...        | 70          | DPWA $K^-p \rightarrow \Sigma\pi$    |

$\Sigma(2100)$  WIDTH

| <i>VALUE (MeV)</i> | <i>DOCUMENT ID</i> | <i>TECN</i> | <i>COMMENT</i>                       |
|--------------------|--------------------|-------------|--------------------------------------|
| 260±40             | SARANTSEV 19       | DPWA        | $\bar{K}N$ multichannel              |
| 70±30              | BARBARO-...        | 70          | DPWA $K^-p \rightarrow \Lambda\pi^0$ |
| 135±30             | BARBARO-...        | 70          | DPWA $K^-p \rightarrow \Sigma\pi$    |

$\Sigma(2100)$  DECAY MODES

| Mode                                         | Fraction ( $\Gamma_i/\Gamma$ ) |
|----------------------------------------------|--------------------------------|
| $\Gamma_1$ $N\bar{K}$                        | ( 8.0±2.0 ) %                  |
| $\Gamma_2$ $\Lambda\pi$                      | ( 1.5±1.0 ) %                  |
| $\Gamma_3$ $\Sigma\pi$                       | ( 2.0±1.0 ) %                  |
| $\Gamma_4$ $\Xi K$                           |                                |
| $\Gamma_5$ $\Sigma(1385)\pi$ , D-wave        | (12 ±6 ) %                     |
| $\Gamma_6$ $\Sigma(1385)\pi$ , G-wave        |                                |
| $\Gamma_7$ $\Lambda(1520)\pi$ , F-wave       | ( 1.0±1.0 ) %                  |
| $\Gamma_8$ $\Lambda(1520)\pi$ , H-wave       |                                |
| $\Gamma_9$ $N\bar{K}^*(892)$ , S=3/2, D-wave | ( 6.0±3.0 ) %                  |
| $\Gamma_{10}$ $\Delta\bar{K}$ , G-wave       | ( 1.0±1.0 ) %                  |

$\Sigma(2100)$  BRANCHING RATIOS

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

| $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2100) \rightarrow \Lambda\pi$ | $(\Gamma_1\Gamma_2)^{1/2}/\Gamma$                   |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <i>VALUE</i>                                                                                                   | <i>DOCUMENT ID</i> <i>TECN</i> <i>COMMENT</i>       |
| −0.07±0.02                                                                                                     | BARBARO-... 70 DPWA $K^-p \rightarrow \Lambda\pi^0$ |

| $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}}$ in $N\bar{K} \rightarrow \Sigma(2100) \rightarrow \Sigma \pi$ |                |      |                                | $(\Gamma_1 \Gamma_3)^{1/2} / \Gamma$ |
|-------------------------------------------------------------------------------------------------------------------|----------------|------|--------------------------------|--------------------------------------|
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| $+0.13 \pm 0.02$                                                                                                  | BARBARO-... 70 | DPWA | $K^- p \rightarrow \Sigma \pi$ |                                      |
| $\Gamma(N\bar{K}) / \Gamma_{\text{total}}$                                                                        |                |      |                                | $\Gamma_1 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.08 ± 0.02</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Lambda\pi) / \Gamma_{\text{total}}$                                                                      |                |      |                                | $\Gamma_2 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.015 ± 0.01</b>                                                                                               | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Sigma\pi) / \Gamma_{\text{total}}$                                                                       |                |      |                                | $\Gamma_3 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.02 ± 0.01</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Xi K) / \Gamma_{\text{total}}$                                                                           |                |      |                                | $\Gamma_4 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <0.01                                                                                                             | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Sigma(1385)\pi, D\text{-wave}) / \Gamma_{\text{total}}$                                                  |                |      |                                | $\Gamma_5 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.12 ± 0.06</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Sigma(1385)\pi, G\text{-wave}) / \Gamma_{\text{total}}$                                                  |                |      |                                | $\Gamma_6 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| ~ 0.01                                                                                                            | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Lambda(1520)\pi, F\text{-wave}) / \Gamma_{\text{total}}$                                                 |                |      |                                | $\Gamma_7 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.01 ± 0.01</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Lambda(1520)\pi, H\text{-wave}) / \Gamma_{\text{total}}$                                                 |                |      |                                | $\Gamma_8 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| ~ 0                                                                                                               | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(N\bar{K}^*(892), S=3/2, D\text{-wave}) / \Gamma_{\text{total}}$                                           |                |      |                                | $\Gamma_9 / \Gamma$                  |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.06 ± 0.03</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |
| $\Gamma(\Delta\bar{K}, G\text{-wave}) / \Gamma_{\text{total}}$                                                    |                |      |                                | $\Gamma_{10} / \Gamma$               |
| VALUE                                                                                                             | DOCUMENT ID    | TECN | COMMENT                        |                                      |
| <b>0.01 ± 0.01</b>                                                                                                | SARANTSEV 19   | DPWA | $\bar{K} N$ multichannel       |                                      |

### $\Sigma(2100)$ REFERENCES

|                          |                |                       |              |
|--------------------------|----------------|-----------------------|--------------|
| SARANTSEV 19             | EPJ A55 180    | A.V. Sarantsev et al. | (BONN, PNPI) |
| BARBARO-... 70           | Duke Conf. 173 | A. Barbaro-Galtieri   | (LRL) IJP    |
| Hyperon Resonances, 1970 |                |                       |              |