NODE=B058

# $\Sigma(1690)$ Bumps

$I(J^P) = 1(?^?)$ Status: **

OMITTED FROM SUMMARY TABLE

See the note preceding the $\Sigma(1670)$ Listings. Seen in production experiments only, mainly in $\Lambda\pi$.

NODE=B058

## $\Sigma(1690)$ MASS (PRODUCTION EXPERIMENTS)

NODE=B058M

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| **≈ 1690 OUR ESTIMATE** | | | | | | |
| 1698±20 | 70 | [1] GODDARD | 79 | HBC | + | $\pi^+ p$ 10.3 GeV/$c$ |
| 1707±20 | 40 | [2] GODDARD | 79 | HBC | + | $\pi^+ p$ 10.3 GeV/$c$ |
| 1698±20 | 15 | ADERHOLZ | 69 | HBC | + | $\pi^+ p$ 8 GeV/$c$ |
| 1682± 2 | 46 | BLUMENFELD | 69 | HBC | + | $K^0_L p$ |
| 1700±20 | | MOTT | 69 | HBC | + | $K^- p$ 5.5 GeV/$c$ |
| 1694±24 | 60 | [3] PRIMER | 68 | HBC | + | $K^- p$ 4.6–5 GeV/$c$ |
| 1700± 6 | | [4] SIMS | 68 | HBC | − | $K^- N \rightarrow \Lambda\pi\pi$ |
| 1715±12 | 30 | COLLEY | 67 | HBC | + | $K^- p$ 6 GeV/$c$ |

NODE=B058M
→ UNCHECKED ←
OCCUR=2

## $\Sigma(1690)$ WIDTH (PRODUCTION EXPERIMENTS)

NODE=B058W

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| 240± 60 | 70 | [1] GODDARD | 79 | HBC | + | $\pi^+ p$ 10.3 GeV/$c$ |
| $130^{+100}_{-\ 60}$ | 40 | [2] GODDARD | 79 | HBC | + | $\pi^+ p$ 10.3 GeV/$c$ |
| 142± 40 | 15 | ADERHOLZ | 69 | HBC | + | $\pi^+ p$ 8 GeV/$c$ |
| 25± 10 | 46 | BLUMENFELD | 69 | HBC | + | $K^0_L p$ |
| 130± 25 | | MOTT | 69 | HBC | + | $K^- p$ 5.5 GeV/$c$ |
| 105± 35 | 60 | [3] PRIMER | 68 | HBC | + | $K^- p$ 4.6–5 GeV/$c$ |
| 62± 14 | | [4] SIMS | 68 | HBC | − | $K^- N \rightarrow \Lambda\pi\pi$ |
| 100± 35 | 30 | COLLEY | 67 | HBC | + | $K^- p$ 6 GeV/$c$ |

NODE=B058W
OCCUR=2

## $\Sigma(1690)$ DECAY MODES (PRODUCTION EXPERIMENTS)

NODE=B058215;NODE=B058

| | Mode | |
|---|---|---|
| $\Gamma_1$ | $N\overline{K}$ | DESIG=1 |
| $\Gamma_2$ | $\Lambda\pi$ | DESIG=2 |
| $\Gamma_3$ | $\Sigma\pi$ | DESIG=3 |
| $\Gamma_4$ | $\Sigma(1385)\pi$ | DESIG=4 |
| $\Gamma_5$ | $\Lambda\pi\pi$ (including $\Sigma(1385)\pi$) | DESIG=5 |

## $\Sigma(1690)$ BRANCHING RATIOS (PRODUCTION EXPERIMENTS)

NODE=B058220

### $\Gamma(N\overline{K})/\Gamma(\Lambda\pi)$ $\Gamma_1/\Gamma_2$

NODE=B058R1

| VALUE | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| small | | GODDARD | 79 | HBC | + | $\pi^+ p$ 10.2 GeV/$c$ |
| <0.2 | | MOTT | 69 | HBC | + | $K^- p$ 5.5 GeV/$c$ |
| 0.4±0.25 | 18 | COLLEY | 67 | HBC | + | 6/30 events |

NODE=B058R1

### $\Gamma(\Sigma\pi)/\Gamma(\Lambda\pi)$ $\Gamma_3/\Gamma_2$

NODE=B058R2

| VALUE | CL% | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| small | | GODDARD | 79 | HBC | + | $\pi^+ p$ 10.2 GeV/$c$ |
| <0.4 | 90 | MOTT | 69 | HBC | + | $K^- p$ 5.5 GeV/$c$ |
| 0.3±0.3 | | COLLEY | 67 | HBC | + | 4/30 events |

NODE=B058R2

### $\Gamma(\Sigma(1385)\pi)/\Gamma(\Lambda\pi)$ $\Gamma_4/\Gamma_2$

NODE=B058R3

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| <0.5 | MOTT | 69 | HBC | + | $K^- p$ 5.5 GeV/$c$ |

NODE=B058R3

### $\Gamma(\Lambda\pi\pi(\text{including }\Sigma(1385)\pi))/\Gamma(\Lambda\pi)$ $\Gamma_5/\Gamma_2$

NODE=B058R4
NODE=B058R4

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| $2.0\pm0.6$ | BLUMENFELD | 69 | HBC | + | 31/15 events |
| $0.5\pm0.25$ | COLLEY | 67 | HBC | + | 15/30 events |

### $\Gamma(\Sigma(1385)\pi)/\Gamma(\Lambda\pi\pi(\text{including }\Sigma(1385)\pi))$ $\Gamma_4/\Gamma_5$

NODE=B058R5
NODE=B058R5

| VALUE | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| large | SIMS | 68 | HBC | − | $K^- N \rightarrow \Lambda\pi\pi$ |
| small | COLLEY | 67 | HBC | + | $K^- p$ 6 GeV/$c$ |

## $\Sigma(1690)$ FOOTNOTES (PRODUCTION EXPERIMENTS)

NODE=B058

[1] From $\pi^+ p \rightarrow (\Lambda\pi^+)K^+$. $J > 1/2$ is not required by the data.
NODE=B058;LINKAGE=C

[2] From $\pi^+ p \rightarrow (\Lambda\pi^+)(K\pi)^+$. $J > 1/2$ is indicated, but large background precludes a definite conclusion.
NODE=B058;LINKAGE=D

[3] See the $\Sigma(1670)$ Listings. AGUILAR-BENITEZ 70B with three times the data of PRIMER 68 find no evidence for the $\Sigma(1690)$.
NODE=B058;LINKAGE=A

[4] This analysis, which is difficult and requires several assumptions and shows no unambiguous $\Sigma(1690)$ signal, suggests $J^P = 5/2^+$. Such a state would lead all previously known $Y^*$ trajectories.
NODE=B058;LINKAGE=B

## $\Sigma(1690)$ REFERENCES (PRODUCTION EXPERIMENTS)

NODE=B058


| | | | | |
|---|---|---|---|---|
| GODDARD | 79 | PR D19 1350 | M.C. Goddard *et al.* | (TNTO, BNL) IJ |
| AGUILAR-... | 70B | PRL 25 58 | M. Aguilar-Benitez *et al.* | (BNL, SYRA) |
| ADERHOLZ | 69 | NP B11 259 | M. Aderholz *et al.* | (AACH3, BERL, CERN+) I |
| BLUMENFELD | 69 | PL 29B 58 | B.J. Blumenfeld, G.R. Kalbfleisch | (BNL) I |
| MOTT | 69 | PR 177 1966 | J. Mott *et al.* | (NWES, ANL) I |
| Also | | PRL 18 266 | M. Derrick *et al.* | (ANL, NWES) I |
| PRIMER | 68 | PRL 20 610 | M. Primer *et al.* | (SYRA, BNL) I |
| SIMS | 68 | PRL 21 1413 | W.H. Sims *et al.* | (FSU, TUFTS, BRAN) I |
| COLLEY | 67 | PL 24B 489 | D.C. Colley | (BIRM, GLAS, LOIC, MUNI, OXF+) I |


REFID=32203
REFID=20692
REFID=20687
REFID=32096
REFID=20079
REFID=32197
REFID=32179
REFID=32137
REFID=32196