Baryon Full Listings

$\Sigma(1670)$ Bumps, $\Sigma(1690)$ Bumps

$\Gamma(\Lambda\pi)/\Gamma(\Sigma\pi)$ Γ_2/Γ_3

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
0.76 ± 0.09		ESTES	74	HBC	0	K^- p 2.1,2.6 GeV/c
0.45 ± 0.15		BARNES	69E	HBC	+	K^- p 3.9–5 GeV/c
0.15 ± 0.07		HUWE	69	HBC	+	
0.11 ± 0.06	33	BUTTON-...	68	HBC	+	K^- p 1.7 GeV/c
• • • We do not use the following data for averages, fits, limits, etc. • • •						
≤ 0.45 ± 0.07		TIMMERMANS	76	HBC	+	K^- p 4.2 GeV/c
0.55 ± 0.11		BERTHON	74	HBC	0	Quasi-2-body σ
0	0	PRIMER	68	HBC	+	See BARNES 69E
< 0.6		LONDON	66	HBC	+	K^- p 2.25 GeV/c
1.2	130	ALVAREZ	63	HBC	+	K^- p 1.15 GeV/c
1.2		SMITH	63	HBC	−0	

$\Gamma(\Lambda\pi\pi)/\Gamma(\Sigma\pi)$ Γ_4/Γ_3

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
< 0.6		LONDON	66	HBC	+	K^- p 2.25 GeV/c
0.56	90	ALVAREZ	63	HBC	+	K^- p 1.15 GeV/c
0.17		SMITH	63	HBC	−0	

$\Gamma(\Sigma\pi\pi)/\Gamma(\Sigma\pi)$ Γ_5/Γ_3

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
largest at small angles		ESTES	74	HBC	0	K^- p 2.1,2.6 GeV/c
• • • We do not use the following data for averages, fits, limits, etc. • • •						
< 0.2		[2] HEPP	76	DBC	−	K^- N 1.6–1.75 GeV/c
0.56	180	ALVAREZ	63	HBC	+	K^- p 1.15 GeV/c

$\Gamma(\Lambda(1405)\pi)/\Gamma(\Sigma\pi)$ Γ_7/Γ_3

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
1.8 ± 0.3 to 0.02 ± 0.07		[3,4] TIMMERMANS	76	HBC	+	K^- p 4.2 GeV/c
largest at small angles		ESTES	74	HBC	±	K^- p 2.1,2.6 GeV/c
3.0 ± 1.6	50	LONDON	66	HBC	+	K^- p 2.25 GeV/c
• • • We do not use the following data for averages, fits, limits, etc. • • •						
0.58 ± 0.20	17	PRIMER	68	HBC	+	See BARNES 69E

$\Gamma(\Sigma\pi)/\Gamma(\Sigma\pi\pi)$ Γ_3/Γ_5

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
varies with prod. angle	[5] APSELL	74	HBC	+	K^- p 2.87 GeV/c
1.39 ± 0.16	BERTHON	74	HBC	0	Quasi-2-body σ
2.5 to 0.24	[4] EBERHARD	69	HBC		K^- p 2.6 GeV/c
< 0.4	BIRMINGHAM	66	HBC	+	K^- p 3.5 GeV/c
0.30 ± 0.15	LONDON	66	HBC	+	K^- p 2.25 GeV/c

$\Gamma(\Lambda(1405)\pi)/\Gamma(\Sigma\pi\pi)$ Γ_7/Γ_5

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.97 ± 0.08	TIMMERMANS	76	HBC		K^- p 4.2 GeV/c
1.00 ± 0.02	APSELL	74	HBC		K^- p 2.87 GeV/c
$0.90^{+0.10}_{-0.16}$	EBERHARD	65	HBC	+	K^- p 2.45 GeV/c

$\Gamma(\Lambda(1405)\pi)/\Gamma(\Sigma(1385)\pi)$ Γ_7/Γ_6

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
< 0.8	EBERHARD	65	HBC	+	K^- p 2.45 GeV/c

$\Gamma(\Lambda\pi\pi)/\Gamma(\Sigma\pi\pi)$ Γ_4/Γ_5

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.35 ± 0.2	BIRMINGHAM	66	HBC	+	K^- p 3.5 GeV/c

$\Gamma(\Lambda\pi)/\Gamma(\Sigma\pi\pi)$ Γ_2/Γ_5

VALUE	DOCUMENT ID		TECN	CHG	COMMENT
< 0.2	BIRMINGHAM	66	HBC	+	K^- p 3.5 GeV/c

$\Gamma(\Lambda\pi)/[\Gamma(\Lambda\pi)+\Gamma(\Sigma\pi)]$ $\Gamma_2/(\Gamma_2+\Gamma_3)$

VALUE	DOCUMENT ID		TECN
< 0.6	AGUILAR-...	70B	HBC

$\Gamma(\Sigma(1385)\pi)/\Gamma(\Sigma\pi)$ Γ_6/Γ_3

VALUE	DOCUMENT ID		TECN	COMMENT
≤ 0.21 ± 0.05	TIMMERMANS	76	HBC	K^- p 4.2 GeV/c

$\Sigma(1670)$ QUANTUM NUMBERS (PRODUCTION EXPERIMENTS)

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
$J^P = 3/2^-$	400	BUTTON-...	68	HBC	±	$\Sigma^0\pi$
$J^P = 3/2^-$		EBERHARD	67	HBC	+	$\Lambda(1405)\pi$
$J^P = 3/2^+$		LEVEQUE	65	HBC		$\Lambda(1405)\pi$

$\Sigma(1670)$ FOOTNOTES

[1] Total cross-section bump with $(J+1/2)$ Γ_{el} / Γ_{total} = 0.23.
[2] Enhancements in $\Sigma\pi$ and $\Sigma\pi\pi$ cross sections.
[3] Backward production in the $\Lambda\pi^-$ K^+ final state.
[4] Depending on production angle.
[5] APSELL 74, ESTES 74, and TIMMERMANS 76 find strong branching ratio dependence on production angle, as in earlier production experiments.

$\Sigma(1670)$ REFERENCES (PRODUCTION EXPERIMENTS)

FERRERSORIA 81 NP B178 373 +Treille, Rivet, Volte+ (CERN, CDEF, EPOL, LALO)
CARROLL 76 PRL 37 806 +Chiang, Kycia, Li, Mazur, Michael+ (BNL) I
HEPP 76 NP B115 82 +Braun, Grimm, Stroebele+ (CERN, HEID, MPIM) I
TIMMERMANS 76 NP B112 77 +Engelen+ (NIJM, CERN, AMST, OXF) JP
APSELL 74 PR D10 1419 +Ford, Gourevitch+ (BRAN, UMD, SYRA, TUFTS) I
BERTHON 74 NC 21A 146 +Tristram+ (CDEF, RHEL, SACL, STRB)
ESTES 74 LBL-3827 Thesis (LBL)
AGUILAR-... 70B PRL 25 58 Aguilar-Benitez, Barnes, Bassano+ (BNL, SYRA)
BARNES 69E BNL 13823 +Chung, Eisner, Flaminio+ (BNL, SYRA)
EBERHARD 69 PRL 22 200 +Friedman, Pripstein, Ross (LRL)
HUWE 69 PR 180 1824 (LRL)
BUGG 68 PR 168 1466 +Gilmore, Knight+ (RHEL, BIRM, CAVE) I
BUTTON-... 68 PRL 21 1123 Button-Shafer (MASA, LRL) JP
PRIMER 68 PRL 20 610 +Goldberg, Jaeger, Barnes, Dornan+ (SYRA, BNL)
EBERHARD 67 PR 163 1446 +Pripstein, Shively, Kruse, Swanson (LRL, ILL) IJP
BIRMINGHAM 66 PR 152 1148 (BIRM, GLAS, LOIC, OXF, RHEL)
LONDON 66 PR 143 1034 +Rau, Goldberg, Lichtman+ (BNL, SYRA) IJ
EBERHARD 65 PRL 14 466 +Shively, Ross, Siegal, Ficenec+ (LRL, ILL) I
LEVEQUE 65 PL 18 69 + (SACL, EPOL, GLAS, LOIC, OXF, RHEL) JP
ALVAREZ 63 PRL 10 184 +Alston, Ferro-Luzzi, Huwe+ (LRL) I
SMITH 63 Athens Conf. 67 (LRL)
ALEXANDER 62C CERN Conf. 320 +Jacobs, Kalbfleisch, Miller+ (LRL) I

$\Sigma(1690)$ 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 $\Lambda\pi$.

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

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
≈ 1690 OUR ESTIMATE						
1698 ± 20	70	[1] GODDARD	79	HBC	+	π^+ p 10.3 GeV/c
1707 ± 20	40	[2] GODDARD	79	HBC	+	π^+ p 10.3 GeV/c
1698 ± 20	15	ADERHOLZ	69	HBC	+	π^+ 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 → $\Lambda\pi\pi$
1715 ± 12	30	COLLEY	67	HBC	+	K^- p 6 GeV/c

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

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
240 ± 60	70	[1] GODDARD	79	HBC	+	π^+ p 10.3 GeV/c
130^{+100}_{-60}	40	[2] GODDARD	79	HBC	+	π^+ p 10.3 GeV/c
142 ± 40	15	ADERHOLZ	69	HBC	+	π^+ 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 → $\Lambda\pi\pi$
100 ± 35	30	COLLEY	67	HBC	+	K^- p 6 GeV/c

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

	Mode
Γ_1	$N\overline{K}$
Γ_2	$\Lambda\pi$
Γ_3	$\Sigma\pi$
Γ_4	$\Sigma(1385)\pi$
Γ_5	$\Lambda\pi\pi$ (including $\Sigma(1385)\pi$)

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

$\Gamma(N\overline{K})/\Gamma(\Lambda\pi)$ Γ_1/Γ_2

VALUE	EVTS	DOCUMENT ID		TECN	CHG	COMMENT
small		GODDARD	79	HBC	+	π^+ 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