NODE=B023

$\Sigma(1480)$ Bumps

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

OMITTED FROM SUMMARY TABLE

These are peaks seen in $\Lambda\pi$ and $\Sigma\pi$ spectra in the reaction $\pi^+ p \to (Y\pi)K^+$ at 1.7 GeV/c. Also, the Y polarization oscillates in the same region.

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MILLER 70 suggests a possible alternate explanation in terms of a reflection of $N(1675) \to \Lambda K$ decay. However, such an explanation for the $(\Sigma^+\pi^0)K^+$ channel in terms of $\Delta(1650) \to \Sigma K$ decay seems unlikely (see PAN 70). In addition such reflections would also have to account for the oscillation of the Y polarization in the 1480 MeV region.

HANSON 71, with less data than PAN 70, can neither confirm nor deny the existence of this state. MAST 75 sees no structure in this region in $K^- p \to \Lambda\pi^0$.

ENGELEN 80 performs a multichannel analysis of $K^- p \to p\overline{K}^0\pi^-$ at 4.2 GeV/c. They observe a 3.5 standard-deviation signal at 1480 MeV in $p\overline{K}^0$ which cannot be explained as a reflection of any competing channel.

PRAKHOV 04 sees no evidence for this or other light Σ resonances, aside from the $\Sigma(1385)$, in $K^- p \to \Lambda\pi^0\pi^0$.

ZYCHOR 06 finds peaks in $pp \to pK^+(\pi^\pm X^\mp)$ at $p_{\text{beam}} = 3.65$ GeV/c.

$\Sigma(1480)$ MASS (PRODUCTION EXPERIMENTS)

NODE=B023M

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
≈ 1480 OUR ESTIMATE						NODE=B023M
						→ UNCHECKED ←
1480±15	365 ± 60	ZYCHOR	06	SPEC	$pp \to pK^+(\pi^\pm X^\mp)$	
1480	120	ENGELEN	80	HBC	$K^- p \to (p\overline{K}^0)\pi^-$	
1485±10		CLINE	73	MPWA	$K^- d \to (\Lambda\pi^-)p$	
1479±10		PAN	70	HBC	$\pi^+ p \to (\Lambda\pi^+)K^+$	
1465±15		PAN	70	HBC	$\pi^+ p \to (\Sigma\pi)K^+$	OCCUR=2

$\Sigma(1480)$ WIDTH (PRODUCTION EXPERIMENTS)

NODE=B023W

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*	
						NODE=B023W
60±15	365 ± 60	ZYCHOR	06	SPEC	$pp \to pK^+(\pi^\pm X^\mp)$	
80±20	120	ENGELEN	80	HBC	$K^- p \to (p\overline{K}^0)\pi^-$	
40±20		CLINE	73	MPWA	$K^- d \to (\Lambda\pi^-)p$	
31±15		PAN	70	HBC	$\pi^+ p \to (\Lambda\pi^+)K^+$	
30±20		PAN	70	HBC	$\pi^+ p \to (\Sigma\pi)K^+$	OCCUR=2

$\Sigma(1480)$ DECAY MODES (PRODUCTION EXPERIMENTS)

NODE=B023215;NODE=B023

	Mode	
Γ_1	$N\overline{K}$	DESIG=1
Γ_2	$\Lambda\pi$	DESIG=2
Γ_3	$\Sigma\pi$	DESIG=3

$\Sigma(1480)$ BRANCHING RATIOS (PRODUCTION EXPERIMENTS)

NODE=B023220

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

NODE=B023R1

VALUE	*DOCUMENT ID*		*TECN*	*CHG*	
					NODE=B023R1
0.82±0.51	PAN	70	HBC	+	

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

NODE=B023R2
NODE=B023R2

VALUE	DOCUMENT ID		TECN	CHG
0.72 ± 0.50	PAN	70	HBC	+

$\Gamma(N\overline{K})/\Gamma_{total}$ Γ_1/Γ

NODE=B023R3
NODE=B023R3

VALUE	DOCUMENT ID		TECN	COMMENT
small	CLINE	73	MPWA	$K^- d \rightarrow (\Lambda\pi^-)p$

$\Sigma(1480)$ REFERENCES (PRODUCTION EXPERIMENTS)

NODE=B023

ZYCHOR	06	PRL 96 012002	I. Zychor *et al.*	(ANKE Collab.)	REFID=51022
PRAKHOV	04	PR C69 042202	S. Prakhov *et al.*	(BNL Crystal Ball Collab.)	REFID=49948
ENGELEN	80	NP B167 61	J.J. Engelen *et al.*	(NIJM, AMST, CERN+)	REFID=22818
MAST	75	PR D11 3078	T.S. Mast *et al.*	(LBL)	REFID=32073
CLINE	73	LNC 6 205	D. Cline, R. Laumann, J. Mapp	(WISC) IJP	REFID=32067
HANSON	71	PR D4 1296	P. Hanson, G.E. Kalmus, J. Louie	(LBL) I	REFID=32072
MILLER	70	Duke Conf. 229 Hyperon Resonances, 1970	D.H. Miller	(PURD)	REFID=32071
PAN	70	PR D2 449	Y.L. Pan *et al.*	(PENN)	REFID=32066
Also		PRL 23 808	Y.L. Pan, F.L. Forman	(PENN) I	REFID=32027
Also		PRL 23 806	Y.L. Pan, F.L. Forman	(PENN) I	REFID=32069