$$\Sigma$$
(1385) 3/2⁺

$$I(J^P) = 1(\frac{3}{2}^+)$$
 Status: ***

Discovered by ALSTON 60. Early measurements of the mass and width for combined charge states have been omitted. They may be found in our 1984 edition Reviews of Modern Physics **56** S1 (1984).

We average only the most significant determinations. We do not average results from inclusive experiments with large backgrounds or results which are not accompanied by some discussion of experimental resolution. Nevertheless systematic differences between experiments remain. (See the ideograms in the Listings below.) These differences could arise from interference effects that change with production mechanism and/or beam momentum. They can also be accounted for in part by differences in the parametrizations employed. (See BORENSTEIN 74 for a discussion on this point.) Thus BORENSTEIN 74 uses a Breit-Wigner with energyindependent width, since a P-wave was found to give unsatisfactory fits. CAMERON 78 uses the same form. On the other hand HOLM-GREN 77 obtains a good fit to their $\Lambda\pi$ spectrum with a *P*-wave Breit-Wigner, but includes the partial width for the $\Sigma \pi$ decay mode in the parametrization. AGUILAR-BENITEZ 81D gives masses and widths for five different Breit-Wigner shapes. The results vary considerably. Only the best-fit S-wave results are given here.

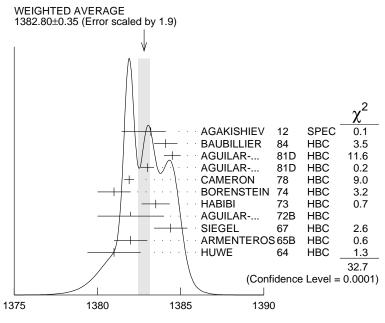
Σ (1385) POLE POSITIONS

Σ (1385) $^+$ REAL PART		
VALUE	DOCUMENT ID	COMMENT
$1379\!\pm\!1$	LICHTENBERG74	Extrapolates HABIBI 73
Σ (1385) $^+$ –IMAGINARY PAR	rT.	
VALUE	DOCUMENT ID	COMMENT
17.5 ± 1.5	LICHTENBERG74	Extrapolates HABIBI 73
Σ (1385) $^-$ REAL PART		
VALUE	DOCUMENT ID	COMMENT
1383 ± 1	LICHTENBERG74	Extrapolates HABIBI 73
Σ (1385) $^-$ –IMAGINARY PAR	rT.	
VALUE	DOCUMENT ID	COMMENT
22.5±1.5	LICHTENBERG74	Extrapolates HABIBI 73

Σ(1385) MASSES

Σ (1385) $^+$ MASS

VALUE (I	MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
	±0.35 OUR	AVERAGE	Error includes so	ale fa	ctor of 1	1.9. See the ideogram
below.	. 0.1					
1383.2	$\pm 0.9 {}^{+ 0.1}_{- 1.5}$		AGAKISHIEV	12	SPEC	$pp \rightarrow \Sigma(1385)^+ K^+ n$, 3.5 GeV
1384.1	± 0.7	1897	BAUBILLIER	84	HBC	$K^- p \ 8.25 \ \text{GeV}/c$
1384.5	± 0.5	5256	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda \pi \pi \ 4.2 \ { m GeV}/c$
1383.0	± 0.4	9361	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda 3\pi \ 4.2 \ \mathrm{GeV}/c$
1381.9	± 0.3	6900	CAMERON	78	HBC	$K^- p 0.96 – 1.36 \text{ GeV}/c$
1381	± 1	6846	BORENSTEIN	74	HBC	$K^- p \ 2.18 \ \text{GeV}/c$
1383.5	± 0.85	2300	HABIBI	73	HBC	$K^- p \rightarrow \Lambda \pi \pi$
1382	± 2	400	AGUILAR	72 B	HBC	$K^- ho ightarrow \Lambda \pi$'s
1384.4	± 1.0	1260	SIEGEL	67	HBC	K^-p 2.1 GeV/ c
1382	± 1	750	ARMENTEROS	565 B	HBC	$K^- p 0.9 – 1.2 \text{ GeV}/c$
1381.0	± 1.6	859	HUWE	64	HBC	$K^- p$ 1.22 GeV/ c
• • • V	Ve do not use	the follow	ing data for averag	ges, fi	ts, limits	, etc. • • •
1385.1	± 1.2	600	BAKER	80	HYBR	π^+ p 7 GeV/c
1383.2	± 1.0	750	BAKER	80	HYBR	K^-p 7 GeV/ c
1381	± 2	7k	¹ BAUBILLIER	79 B	HBC	$K^- p 8.25 \text{ GeV}/c$
1391	± 2	2k	CAUTIS	79	HYBR	$\pi^+ p/K^- p 11.5 {\rm GeV}$
1390	± 2	100	¹ SUGAHARA	79 B	HBC	$\pi^- p$ 6 GeV/ c
1385	± 3	22k ¹	^{.,2} BARREIRO	77 B	HBC	$K^- p 4.2 \text{ GeV}/c$
1385	± 1	2594	HOLMGREN	77	HBC	See AGUILAR-
1380	± 2		¹ BARDADIN	75	НВС	BENITEZ 81D $K^- p$ 14.3 GeV/ c
1382	± 1	3740	³ BERTHON	74	HBC	$K^- p$ 14.3 GeV/C $K^- p$ 1263–1843 MeV/C
1390	± 6	46	AGUILAR	7 4 70в	HBC	$K^- p \rightarrow \Sigma \pi' \text{s 4 GeV}/c$
1383	±8	40 62	⁴ BIRMINGHAM		HBC	$K^- p \rightarrow 2\pi s 4 \text{ GeV/C}$ $K^- p 3.5 \text{ GeV/}c$
1378	± 5	135	LONDON	66	HBC	K^{-} p 2.24 GeV/c
1384.3		250	⁴ SMITH		HBC	•
1382.6		250 250	⁴ SMITH	65 65	нвс НВС	$K^- p 1.8 \text{ GeV}/c$ $K^- p 1.95 \text{ GeV}/c$
1375.0		250 170	COOPER	64	нвс НВС	$K^{-}p$ 1.45 GeV/c
			⁴ ELY	-		•
1376.0	±3.9	154	CLY	61	HLBC	K^-p 1.11 GeV/ c

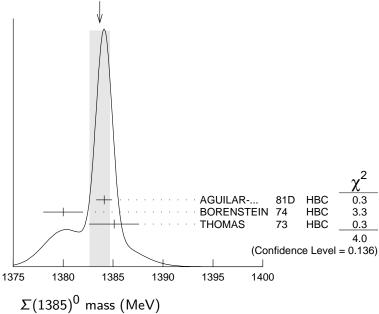


 $\Sigma(1385)^+$ mass (MeV)

Σ (1385)⁰ MASS

` '				
VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
1383.7±1.0 OUR	AVERAGE	Error includes scale	factor of 1.	4. See the ideogram below.
1384.1 ± 0.8	5722	AGUILAR 8	B1D HBC	$K^- p \rightarrow \Lambda 3\pi \ 4.2 \ { m GeV}/c$
1380 ± 2	3100	⁵ BORENSTEIN 7	74 HBC	$K^- p \rightarrow \Lambda 3\pi \ 2.18$
				GeV/c
$1385.1\!\pm\!2.5$	240	⁴ THOMAS	73 HBC	$\pi^- ho ightarrow \Lambda \pi^0 K^0$
\bullet \bullet We do not	use the follo	wing data for average	es, fits, limit	s, etc. • • •
1389 ±3	500	⁶ BAUBILLIER 7	79в НВС	K^-p 8.25 GeV/ c

WEIGHTED AVERAGE 1383.7±1.0 (Error scaled by 1.4)



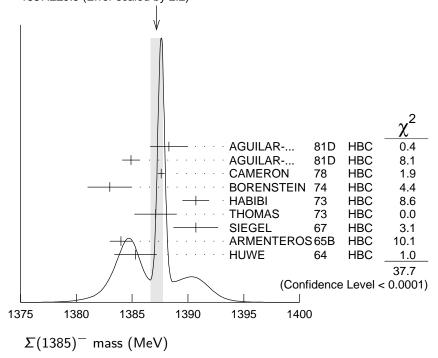
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Page 3

Σ (1385)⁻ MASS

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
1387.2±0.5 OUR AV			o fact		. See the ideogram below.
					~
1388.3 ± 1.7	620	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda \pi \pi 4.2 \text{ GeV}/c$
1384.9 ± 0.8	3346	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda 3\pi \ 4.2 \ \text{GeV}/c$
1387.6 ± 0.3	9720	CAMERON	78	HBC	$K^- p 0.96-1.36 \text{ GeV}/c$
1383 ± 2	2303	BORENSTEIN	74	HBC	$K^- p \ 2.18 \ \text{GeV}/c$
1390.7 ± 1.2	1900	HABIBI	73	HBC	$K^- p \rightarrow \Lambda \pi \pi$
$1387.1 \!\pm\! 1.9$	630	⁴ THOMAS	73	HBC	$\pi^- p \rightarrow \Lambda \pi^- K^+$
$1390.7\!\pm\!2.0$	370	SIEGEL	67	HBC	K^-p 2.1 GeV/ c
1384 ± 1	1380	ARMENTEROS	65 5B	HBC	$K^- p \ 0.9 – 1.2 \ { m GeV}/c$
$1385.3 \!\pm\! 1.9$	1086	⁴ HUWE	64	HBC	$K^- p 1.15 – 1.30 \text{ GeV}/c$
ullet $ullet$ We do not use	the follow	wing data for averag	ges, fi	ts, limits	s, etc. • • •
1383 ± 1	4.5k	¹ BAUBILLIER	79 B	HBC	$K^- p 8.25 \text{ GeV}/c$
1380 ± 6	150	¹ SUGAHARA	79 B	HBC	$\pi^- p$ 6 GeV/ c
1387 ± 3	12k	^{1,2} BARREIRO	77 B	HBC	$K^- p$ 4.2 GeV/ c
1391 ±3	193	HOLMGREN	77	HBC	See AGUILAR- BENITEZ 81D
1383 ± 2		¹ BARDADIN	75	HBC	$K^{-}p$ 14.3 GeV/c
1389 ± 1	3060	³ BERTHON	74	HBC	$K^- p$ 1263–1843 MeV/ c
1389 ± 9	15	LONDON	66	HBC	$K^- p$ 2.24 GeV/ c
$1391.5\!\pm\!2.6$	120	⁴ SMITH	65	HBC	$K^- p$ 1.8 GeV/ c
$1399.8\!\pm\!2.2$	58	⁴ SMITH	65	HBC	K^-p 1.95 GeV/ c
$1392.0\!\pm\!6.2$	200	COOPER	64	HBC	$K^- p 1.45 \text{ GeV}/c$
1382 ±3	93	DAHL	61	DBC	$K^{-} d = 0.45 \text{ GeV}/c$
1376.0 ± 4.4	224	⁴ ELY	61	HLBC	$K^- p \ 1.11 \ {\rm GeV}/c$

WEIGHTED AVERAGE 1387.2±0.5 (Error scaled by 2.2)



$m_{\Sigma(1385)^-} - m_{\Sigma(1385)^+}$

VALUE (MeV)	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the	following	data for averages	, fits,	limits, e	etc. • • •
- 2 to +6	95	$^7\mathrm{BORENSTEIN}$	74	HBC	K^-p 2.18 GeV/ c
7.2 ± 1.4		⁷ HABIBI	73	HBC	$K^- p \rightarrow \Lambda \pi \pi$
6.3 ± 2.0		⁷ SIEGEL	67	HBC	K^-p 2.1 GeV/ c
11 ± 9		⁷ LONDON	66	HBC	$K^- p \ 2.24 \ \text{GeV}/c$
9 ± 6		LONDON	66	HBC	$\Lambda 3\pi$ events
2.0 ± 1.5		⁷ ARMENTEROS	565 B	HBC	$K^- p 0.9 – 1.2 \text{ GeV}/c$
$7.2 \!\pm\! 2.1$		⁷ SMITH	65	HBC	K^-p 1.8 GeV/ c
17.2 ± 2.0		⁷ SMITH	65	HBC	K^-p 1.95 GeV/ c
17 ± 7		⁷ COOPER	64	HBC	$K^- p \ 1.45 \ {\sf GeV}/c$
4.3 ± 2.2		⁷ HUWE	64	HBC	$K^- p 1.22 \text{ GeV}/c$
0.0 ± 4.2		⁷ ELY	61	HLBC	$K^- p \ 1.11 \ {\rm GeV}/c$

$m_{\Sigma(1385)^0} - m_{\Sigma(1385)^+}$

VALUE (MeV)	CL%	DOCUMENT ID	TECN	COMMENT
• • • We do not use the	following	data for averages, fits,	limits, e	etc. • • •
-4 to $+4$	95	⁷ BORENSTEIN 74	HBC	K^-p 2.18 GeV/ c

$m_{\Sigma(1385)^-} - m_{\Sigma(1385)^0}$

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following	g data for averages	, fits,	limits,	etc. • • •
2.0 ± 2.4	⁷ THOMAS	73	HBC	$\pi^- p \rightarrow \Lambda \pi^- K^+$

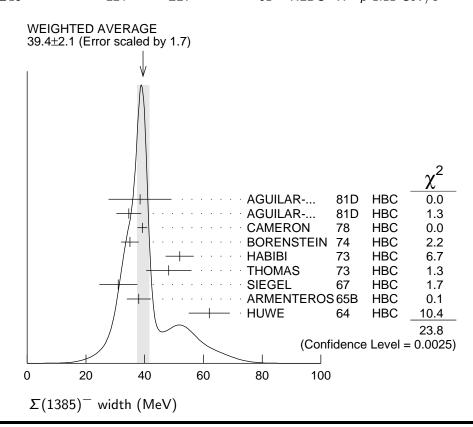
Σ (1385) WIDTHS

Σ (1385)⁺ WIDTH

•	,					
VALUE (N	1eV)	EVTS	DOCUMENT ID		TECN	COMMENT
36.0± (0.7 OUR AVE	RAGE				
40.2± 2	$2.1^{+1.2}_{-2.8}$		AGAKISHIEV	12	SPEC	$pp \rightarrow \Sigma(1385)^+ K^+ n$, 3.5 GeV
37.2± 2	2.0	1897	BAUBILLIER	84	HBC	$K^- p \ 8.25 \ \text{GeV}/c$
35.1± 3	1.7	5256	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda \pi \pi 4.2 \text{ GeV}/c$
$37.5\pm$ 2	2.0	9361	AGUILAR	81 D	HBC	$K^- p \rightarrow \Lambda 3\pi \ 4.2 \ { m GeV}/c$
$35.5\pm$ 3	1.9	6900	CAMERON	78	HBC	$K^- p 0.96-1.36 \text{ GeV}/c$
34.0± 3	1.6	6846	⁸ BORENSTEIN	74	HBC	$K^- p \ 2.18 \ {\sf GeV}/c$
38.3± 3	3.2	2300	⁹ HABIBI	73	HBC	$K^- p \rightarrow \Lambda \pi \pi$
$32.5\pm$ 6	5.0	400	AGUILAR	72 B	HBC	$K^- ho ightarrow \Lambda \pi$'s
36 ± 4	1	1260	⁹ SIEGEL	67	HBC	K^-p 2.1 GeV/ c
32.0± 4	1.7	750	⁹ ARMENTEROS	565 B	HBC	$K^- p \ 0.95 – 1.20 \ { m GeV}/c$
$46.5\pm$ 6	5.4	859	⁹ HUWE	64	HBC	K^-p 1.15–1.30 GeV/ c

• • • We do not use	e the follo	owing data for averag	ges, fi	ts, limits	s, etc. • • •
40 ± 3	600	BAKER	80	HYBR	π^+ p 7 GeV/ c
37 ± 2	750	BAKER	80	HYBR	K^-p 7 GeV/ c
37 ± 2	7k	¹ BAUBILLIER	79 B	HBC	K [−] p 8.25 GeV/c
30 ± 4	2k	CAUTIS	79	HYBR	$\pi^{+} p/K^{-} p 11.5 \text{GeV}$
30 ± 6	100	¹ SUGAHARA	79 B	HBC	$\pi^- p$ 6 GeV/c
43 ± 5	22k	^{1,2} BARREIRO	77 B	HBC	$K^{-}p$ 4.2 GeV/c
34 ± 2	2594	HOLMGREN	77	HBC	See AGUILAR-
	_00.				BENITEZ 81D
40.0 ± 3.2		¹ BARDADIN	75	HBC	$K^- p$ 14.3 GeV/ c
48 ± 3	3740	³ BERTHON	74	HBC	K^-p 1263–1843 MeV/ c
33 ± 20	46	⁹ AGUILAR	70 B	HBC	$K^- p \rightarrow \Sigma \pi$'s 4 GeV/ c
25 ± 32	62	⁹ BIRMINGHAM	66	HBC	$K^- p \ 3.5 \ \text{GeV}/c$
30.3 ± 7.5	250	⁹ SMITH	65	HBC	K^-p 1.8 GeV/ c
$33.1\pm$ 8.3	250	⁹ SMITH	65	HBC	$K^- p$ 1.95 GeV/ c
51 ± 16	170	⁹ COOPER	64	HBC	$K^- p 1.45 \text{ GeV}/c$
48 ± 16	154	⁹ ELY	61	HLBC	$K^-p~1.11~{\sf GeV}/c$
Σ(1385) ⁰ WIDTI	u				
•		DOCUMENT ID		TECN	COMMENT
<u>VALUE (MeV)</u> 36 ± 5 OUR AV	<u>EVTS</u> EDAGE	DOCUMENT ID		TECN	COMMENT
34.8 ± 5.6	5722	AGUILAR	81D	НВС	K= n
39.3 ± 10.2	240	9 THOMAS	73	НВС	$K^- p \rightarrow \Lambda 3\pi \ 4.2 \ \text{GeV}/c$ $\pi^- p \rightarrow \Lambda \pi^0 K^0$
• • • We do not use					•
• • • vve do not use	e the folio	owing data for averag	ges, II	15, 11111113	s, etc. • • •
		10			
53 ± 8	3100	¹⁰ BORENSTEIN	74	HBC	$K^- p \rightarrow \Lambda 3\pi \ 2.18$ GeV/ c
53 ± 8 30 ± 9	3100 106	¹⁰ BORENSTEIN CURTIS	74 63	HBC OSPK	GeV/c
30 ± 9	106				GeV/ <i>c</i>
	106				GeV/ <i>c</i>
30 ± 9 Σ(1385) WIDT	106 H <u>EVTS</u>	CURTIS DOCUMENT ID	63	OSPK <u>TECN</u>	$\stackrel{GeV/c}{\pi^-p}$ 1.5 GeV/c
30 ± 9 Σ(1385) WIDT <u>VALUE (MeV)</u>	106 H <u>EVTS</u>	CURTIS DOCUMENT ID	63	OSPK <u>TECN</u>	${ m GeV}/c \ \pi^- p 1.5 { m GeV}/c \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
30 ± 9 Σ(1385) WIDT VALUE (MeV) 39.4± 2.1 OUR AV	106 H <u>EVTS</u> ERAGE	CURTIS DOCUMENT ID Error includes scale	63 facto	OSPK <u>TECN</u> r of 1.7.	${\rm GeV}/c \ \pi^- p \ 1.5 \ {\rm GeV}/c \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
50 ± 9 Σ (1385) WIDT $0.00000000000000000000000000000000000$	106 H EVTS ERAGE 620	CURTIS DOCUMENT ID Error includes scale AGUILAR	63 facto 81D	OSPK TECN r of 1.7. HBC	${ m GeV}/c \ \pi^- p 1.5 { m GeV}/c \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
50 ± 9 $5(1385)^{-}$ WIDT $5($	106 H EVTS ERAGE 620 3346	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON	facto 81D 81D 78	OSPK TECN r of 1.7. HBC HBC HBC	${\rm GeV}/c$ $\pi^- p$ 1.5 ${\rm GeV}/c$ ${\rm COMMENT}$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi$ 4.2 ${\rm GeV}/c$ $K^- p \rightarrow \Lambda 3\pi$ 4.2 ${\rm GeV}/c$ $K^- p$ 0.96–1.36 ${\rm GeV}/c$
50 ± 9 Σ (1385) WIDT 50 50 50 50 50 50 50 50	106 EVTS ERAGE 620 3346 9720	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN	facto 81D 81D 78	OSPK TECN r of 1.7. HBC HBC HBC	${ m GeV}/c$ $\pi^- p$ 1.5 ${ m GeV}/c$ ${ m COMMENT}$ See the ideogram below. ${ m K}^- p ightarrow \Lambda \pi \pi$ 4.2 ${ m GeV}/c$ ${ m K}^- p ightarrow \Lambda 3\pi$ 4.2 ${ m GeV}/c$ ${ m K}^- p$ 0.96–1.36 ${ m GeV}/c$ ${ m K}^- p$ 2.18 ${ m GeV}/c$
50 ± 9 $50 \times (1385)^{-} \text{ WIDT}$	106 H EVTS ERAGE 620 3346 9720 2303	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI	facto 81D 81D 78 74	OSPK TECN r of 1.7. HBC HBC HBC HBC	${\rm GeV}/c$ $\pi^- p$ 1.5 ${\rm GeV}/c$ ${\rm COMMENT}$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi$ 4.2 ${\rm GeV}/c$ $K^- p \rightarrow \Lambda 3\pi$ 4.2 ${\rm GeV}/c$ $K^- p$ 0.96–1.36 ${\rm GeV}/c$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7	106 EVTS ERAGE 620 3346 9720 2303 1900 630	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN	facto 81D 81D 78 74 73	OSPK TECN r of 1.7. HBC HBC HBC HBC HBC HBC	GeV/c $\pi^- p 1.5 \ GeV/c$ $COMMENT$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi \ 4.2 \ GeV/c$ $K^- p \rightarrow \Lambda 3\pi \ 4.2 \ GeV/c$ $K^- p 0.96-1.36 \ GeV/c$ $K^- p 2.18 \ GeV/c$ $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI 9 THOMAS 9 SIEGEL	facto 81D 81D 78 74 73 73 67	OSPK TECN r of 1.7. HBC HBC HBC HBC HBC HBC HBC	${ m GeV}/c$ $\pi^- p$ 1.5 ${ m GeV}/c$ ${ m COMMENT}$ See the ideogram below. ${ m K}^- p ightarrow \Lambda \pi \pi$ 4.2 ${ m GeV}/c$ ${ m K}^- p ightarrow \Lambda 3\pi$ 4.2 ${ m GeV}/c$ ${ m K}^- p$ 0.96–1.36 ${ m GeV}/c$ ${ m K}^- p$ 2.18 ${ m GeV}/c$ ${ m K}^- p ightarrow \Lambda \pi \pi$ ${ m \pi}^- p ightarrow \Lambda \pi^- { m K}^0$ ${ m K}^- p$ 2.1 ${ m GeV}/c$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7	106 EVTS ERAGE 620 3346 9720 2303 1900 630	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON BORENSTEIN HABIBI THOMAS	facto 81D 81D 78 74 73 73 67	OSPK TECN r of 1.7. HBC HBC HBC HBC HBC HBC	GeV/c $\pi^- p 1.5 \ GeV/c$ $COMMENT$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi 4.2 \ GeV/c$ $K^- p \rightarrow \Lambda 3\pi 4.2 \ GeV/c$ $K^- p 0.96-1.36 \ GeV/c$ $K^- p 2.18 \ GeV/c$ $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$ $K^- p 2.1 \ GeV/c$ $K^- p 0.95-1.20 \ GeV/c$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI 9 THOMAS 9 SIEGEL 9 ARMENTEROS	facto 81D 78 74 73 73 67 665B 64	OSPK TECN r of 1.7. HBC HBC HBC HBC HBC HBC HBC HBC HBC	GeV/c $\pi^- p 1.5 \ GeV/c$ $COMMENT$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi 4.2 \ GeV/c$ $K^- p \rightarrow \Lambda 3\pi 4.2 \ GeV/c$ $K^- p 0.96-1.36 \ GeV/c$ $K^- p 2.18 \ GeV/c$ $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$ $K^- p 2.1 \ GeV/c$ $K^- p 0.95-1.20 \ GeV/c$ $K^- p 1.15-1.30 \ GeV/c$
30 ± 9 ∑(1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follo	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI 9 THOMAS 9 SIEGEL 9 ARMENTEROS HUWE	facto 81D 81D 78 74 73 73 67 665B 64 ges, fi	TECN r of 1.7. HBC	GeV/c $\pi^- p 1.5 \ GeV/c$ $COMMENT$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi 4.2 \ GeV/c$ $K^- p \rightarrow \Lambda 3\pi 4.2 \ GeV/c$ $K^- p 0.96-1.36 \ GeV/c$ $K^- p 2.18 \ GeV/c$ $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$ $K^- p 2.1 \ GeV/c$ $K^- p 0.95-1.20 \ GeV/c$ $K^- p 1.15-1.30 \ GeV/c$ 5, etc. • •
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use 44 ± 4	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follow	CURTIS DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON BORENSTEIN HABIBI THOMAS SIEGEL ARMENTEROS HUWE Dwing data for average	facto 81D 78 74 73 67 665B 64 ges, fi	OSPK TECN r of 1.7. HBC	GeV/c $\pi^- p 1.5 \ GeV/c$ $COMMENT$ See the ideogram below. $K^- p \rightarrow \Lambda \pi \pi 4.2 \ GeV/c$ $K^- p \rightarrow \Lambda 3\pi 4.2 \ GeV/c$ $K^- p 0.96-1.36 \ GeV/c$ $K^- p 2.18 \ GeV/c$ $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$ $K^- p 2.1 \ GeV/c$ $K^- p 0.95-1.20 \ GeV/c$ $K^- p 1.15-1.30 \ GeV/c$ s, etc. • •
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use 44 ± 4 58 ± 4	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follow 4.5k 150	DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON BORENSTEIN HABIBI THOMAS SIEGEL ARMENTEROS HUWE Dowing data for average BAUBILLIER SUGAHARA	facto 81D 78 74 73 67 665B 64 ges, fi 79B 79B	OSPK TECN r of 1.7. HBC	GeV/c π^-p 1.5 GeV/c $\frac{COMMENT}{See}$ the ideogram below. $K^-p \rightarrow \Lambda\pi\pi \ 4.2 \ GeV/c$ $K^-p \rightarrow \Lambda 3\pi \ 4.2 \ GeV/c$ $K^-p \ 0.96-1.36 \ GeV/c$ $K^-p \ 2.18 \ GeV/c$ $K^-p \rightarrow \Lambda\pi\pi$ $\pi^-p \rightarrow \Lambda\pi^-K^0$ $K^-p \ 2.1 \ GeV/c$ $K^-p \ 0.95-1.20 \ GeV/c$ $K^-p \ 1.15-1.30 \ GeV/c$ $K^-p \ 8.25 \ GeV/c$ $\pi^-p \ 6 \ GeV/c$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use 44 ± 4 58 ± 4 45 ± 5	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follow 4.5k 150 12k	DOCUMENT ID Error includes scale AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI 9 THOMAS 9 SIEGEL 9 ARMENTEROS HUWE Dwing data for average 1 BAUBILLIER 1 SUGAHARA 1,2 BARREIRO	facto 81D 78 74 73 67 665B 64 ges, fi 79B 79B	TECN r of 1.7. HBC	GeV/c π^-p 1.5 GeV/c $\frac{COMMENT}{See}$ the ideogram below. $K^-p \rightarrow \Lambda\pi\pi \ 4.2 \ GeV/c$ $K^-p \rightarrow \Lambda 3\pi \ 4.2 \ GeV/c$ $K^-p \ 0.96-1.36 \ GeV/c$ $K^-p \ 2.18 \ GeV/c$ $K^-p \rightarrow \Lambda\pi\pi$ $\pi^-p \rightarrow \Lambda\pi^-K^0$ $K^-p \ 2.1 \ GeV/c$ $K^-p \ 0.95-1.20 \ GeV/c$ $K^-p \ 1.15-1.30 \ GeV/c$ So, etc. • • • $K^-p \ 8.25 \ GeV/c$ $\pi^-p \ 6 \ GeV/c$ $K^-p \ 4.2 \ GeV/c$
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use 44 ± 4 58 ± 4	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follow 4.5k 150	DOCUMENT ID Error includes scale AGUILAR AGUILAR CAMERON BORENSTEIN HABIBI THOMAS SIEGEL ARMENTEROS HUWE DWING data for average BAUBILLIER SUGAHARA 1,2 BARREIRO HOLMGREN	facto 81D 78 74 73 67 665B 64 ges, fi 79B 77B 77	OSPK TECN r of 1.7. HBC	GeV/ c $\pi^- p$ 1.5 GeV/ c $\frac{COMMENT}{\text{See the ideogram below.}}$ $K^- p \rightarrow \Lambda \pi \pi$ 4.2 GeV/ c $K^- p \rightarrow \Lambda 3\pi$ 4.2 GeV/ c $K^- p$ 0.96–1.36 GeV/ c $K^- p$ 2.18 GeV/ c $K^- p \rightarrow \Lambda \pi \pi$ $\pi^- p \rightarrow \Lambda \pi^- K^0$ $K^- p$ 2.1 GeV/ c $K^- p$ 0.95–1.20 GeV/ c $K^- p$ 1.15–1.30 GeV/ c $K^- p$ 6 GeV/ c $K^- p$ 8.25 GeV/ c $K^- p$ 4.2 GeV/ c See AGUILAR-BENITEZ 81D
Σ (1385) WIDT VALUE (MeV) 39.4 ± 2.1 OUR AV 38.4 ± 10.7 34.6 ± 4.2 39.2 ± 1.7 35 ± 3 51.9 ± 4.8 48.2 ± 7.7 31.0 ± 6.5 38.0 ± 4.1 62 ± 7 • • • We do not use 44 ± 4 58 ± 4 45 ± 5	106 EVTS ERAGE 620 3346 9720 2303 1900 630 370 1382 1086 e the follow 4.5k 150 12k	DOCUMENT ID Error includes scale AGUILAR CAMERON 8 BORENSTEIN 9 HABIBI 9 THOMAS 9 SIEGEL 9 ARMENTEROS HUWE Dwing data for average 1 BAUBILLIER 1 SUGAHARA 1,2 BARREIRO	facto 81D 78 74 73 67 665B 64 ges, fi 79B 79B	TECN r of 1.7. HBC	GeV/c π^-p 1.5 GeV/c $COMMENT$ See the ideogram below. $K^-p \rightarrow \Lambda\pi\pi \ 4.2 \ GeV/c$ $K^-p \rightarrow \Lambda 3\pi \ 4.2 \ GeV/c$ $K^-p \ 0.96-1.36 \ GeV/c$ $K^-p \ 2.18 \ GeV/c$ $K^-p \rightarrow \Lambda\pi\pi$ $\pi^-p \rightarrow \Lambda\pi^-K^0$ $K^-p \ 2.1 \ GeV/c$ $K^-p \ 0.95-1.20 \ GeV/c$ $K^-p \ 1.15-1.30 \ GeV/c$ See $K^-p \ 4.2 \ GeV/c$ See AGUILAR-

$29.2\!\pm\!10.6$	120	⁹ SMITH	65	HBC	$K^- p \ 1.80 \ {\rm GeV}/c$
$17.1\pm$ 8.9	58	⁹ SMITH	65	HBC	K^-p 1.95 GeV/ c
88 ±24	200	⁹ COOPER	64	HBC	$K^- p 1.45 \text{ GeV}/c$
40		DAHL	61	DBC	$K^- d 0.45 \text{ GeV}/c$
66 + 18	224	⁹ ELY	61	HLBC	$K^{-} p 1.11 \text{ GeV}/c$



Σ (1385) DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
$\overline{\Gamma_1}$	$\Lambda\pi$	(87.0 ±1.5) %	
Γ_2^-	$\Sigma \pi$	(11.7 ± 1.5) %	
Γ3	$\Lambda\gamma$	$(1.25^{+0.13}_{-0.12})\%$	
	$oldsymbol{\Sigma}^+ \gamma$	(7.0 ± 1.7) $ imes$ 10	_3
Γ_5	$rac{oldsymbol{\Sigma}^{-}\gamma}{oldsymbol{N}\overline{K}}$	< 2.4 × 10	90%
Γ_6	NK		

Σ (1385) BRANCHING RATIOS

$\Gamma(\Sigma \pi)/\Gamma(\Lambda \pi)$					Γ_2/Γ_1
VALUE	DOCUMENT ID		TECN	CHG	COMMENT
0.135±0.011 OUR AV	ERAGE				
$0.20\ \pm0.06$	DIONISI	78 B	HBC	\pm	$K^- p \rightarrow Y^* K \overline{K}$
0.16 ± 0.03	BERTHON	74	HBC	+	$K^- p 1.26–1.84 \text{ GeV}/c$
$0.11\ \pm0.02$	BERTHON	74	HBC	_	$K^- p 1.26-1.84 \text{ GeV}/c$
HTTP://PDG.LBL.G	OV F	Page 7	7	Cr	eated: 5/30/2017 17:20

T(129E) EQUINITES							
$VALUE + 0.586 \pm 0.319$		<i>MENT ID</i> ENISH	74R 0				
$(\Gamma_i \Gamma_f)^{\frac{1}{2}} / \Gamma_{\text{total}} \text{ in } N\overline{K} \to \Sigma (1385) \to \Lambda \pi$ $(\Gamma_6 \Gamma_1)^{\frac{1}{2}} / \Gamma_{\text{total}}$							
$<6.1 \times 10^{-4}$ 90	¹³ ARIK	77 SI	PEC –	Σ^- Pb $ ightarrow$ $\Sigma(1385)^-$ Pb, 23 GeV			
• • • We do not use t	he following data for	averages	s, fits, limit	Pb, 600 GeV s, etc. ● ●			
<2.4 × 10 ⁻⁴ 90	12 MOLCHANOV			Σ^- Pb $ ightarrow$ $\Sigma(1385)^-$			
$\Gamma(\Sigma^-\gamma)/\Gamma_{\text{total}}$	DOCUMENT ID	TI	ECN CHG	Γ ₅ /Γ			
$5.98 \pm 1.11 ^{+0.27}_{-0.61}$	¹¹ KELL	ER	12 CLA	S $\gamma p \rightarrow K^0 \Sigma (1385)^+$			
VALUE (%)	<u>DOCUI</u>	MENT ID	TECI	<u>COMMENT</u>			
$\Gamma(\Sigma^+\gamma)/\Gamma(\Sigma\pi)$ This ratio is for Σ	$\Sigma(1385)^+ \rightarrow \Sigma^+ \gamma$	γ over Σ (1385) ⁺ →	Γ_4/Γ_2 Σπ.			
$1.53 \pm 0.39 ^{+0.15}_{-0.24}$	61 TAYLOR	05 C	LAS γp -	$ ightarrow$ $K^{+}\Lambda\gamma$			
3.3.				\rightarrow K ⁺ $\Lambda\gamma$, E_{γ} 1.6–3.8 GeV			
		44 ^	1 A C	v+4 5 46 22 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3			
1.43 ^{+0.15} _{-0.13} OUR AVER		T UIL	COIVI	IVILIV I			
This ratio is of convalue (units 10^{-2})	ourse for $\Sigma(1385)^0$ EVTS DOCUMEN			MENT			
$\Gamma(\Lambda\gamma)/\Gamma(\Lambda\pi)$. 0		0	Γ_3/Γ_1			
0.04 ± 0.04	BASTIEN	61 HE	BC ±	•			
<0.04	ALSTON	62 HE		K^-p 1.15 GeV/ c			
0.09 ± 0.04 • • • We do not use t	HUWE he following data for	64 HE		K ⁻ p 1.2–1.7 GeV s, etc. • • •			
$0.163 \!\pm\! 0.041$	ARMENTEROS			$K^- p 0.95-1.20 \text{ GeV}/c$			
0.13 ± 0.04 0.08 ± 0.06	LONDON	66 HE		•			
0.13 ± 0.04 0.13 ± 0.04	COLLEY PAN	71B DE 69 HE		$K^- N 1.5 \text{ GeV}/c$ $\pi^+ p \rightarrow \Lambda K \pi, \Sigma K \pi$			
0.16 ± 0.07		72B HE		$K^- p$ 3.9, 4.6 GeV/c			
$0.10\ \pm0.05$	THOMAS	73 HE		$\pi^- p \rightarrow \Lambda K \pi, \Sigma K \pi$			
0.18 ± 0.04	MAST	73 MF	PWA ±	$ \begin{array}{c} \Sigma^{0}\pi^{+}\pi^{-} \\ K^{-}p \rightarrow \Lambda\pi^{+}\pi^{-}, \\ \Sigma^{0}\pi^{+}\pi^{-} \end{array} $			
0.21 ± 0.05	BORENSTEIN	74 HE	BC +	$K^- p \rightarrow \Lambda \pi^+ \pi^-,$ $\Sigma^0 \pi^+ \pi^-$			

Σ (1385) FOOTNOTES

¹ From fit to inclusive $\Lambda\pi$ spectrum.

² Includes data of HOLMGREN 77.

³ The errors are statistical only. The resolution is not unfolded.

⁴ The error is enlarged to Γ/\sqrt{N} . See the note on the $K^*(892)$ mass in the 1984 edition.

⁵ From a fit to $\Lambda\pi^0$ with the width fixed at 34 MeV.

⁶ From fit to inclusive $\Lambda\pi^0$ spectrum with the width fixed at 40 MeV.

⁷ Redundant with data in the mass Listings.

Σ (1385) REFERENCES

AGAKISHIEV KELLER KELLER TAYLOR Also MOLCHANOV BAUBILLIER PDG AGUILAR BAKER BAUBILLIER CAUTIS SUGAHARA CAMERON	12 12 11 05 04 84 84 81D 80 79B 79 79B 78	PR C85 035203 PR D85 052004 PR D83 072004 PR C71 054609 PR C72 039902 (errat.) PL B590 161 ZPHY C23 213 RMP 56 S1 AFIS A77 144 NP B166 207 NP B148 18 NP B156 507 NP B156 237 NP B1543 189	G. Agakishiev et al. D. Keller et al. D. Keller et al. S. Taylor et al. S. Taylor et al. V.V. Molchanov et al. M. Baubillier et al. C.G. Wohl et al. M. Aguilar-Benitez, J. Salicio P.A. Baker et al. M. Baubillier et al. C.V. Cautis et al. R. Sugahara et al. W. Cameron et al.	(HADES Collab.) (JLab CLAS Collab.) (FNAL SELEX Collab.) (BIRM, CERN, GLAS+) (LBL, CIT, CERN) (MADR) (LOIC) (BIRM, CERN, GLAS+) (SLAC) (KEK, OSKC, KINK) (RHEL, LOIC)
DIONISI	78B	PL 78B 154	C. Dionisi, R. Armenteros, J. D	
ARIK	77	PRL 38 1000	E. Arik <i>et al.</i>	
BARREIRO	77B	NP B126 319	F. Barreiro <i>et al.</i>	(CERN, AMST, NIJM)
HOLMGREN	77	NP B119 261	S.O. Holmgren <i>et al.</i>	(CERN, AMST, NIJM)
BARDADIN	75	NP B98 418	M. Bardadin-Otwinowska <i>et al.</i> A. Berthon <i>et al.</i>	(SACL, EPOL+)
BERTHON	74	NC 21A 146		(CDEF, RHEL, SACL+)
BORENSTEIN	74	PR D9 3006	S.R. Borenstein <i>et al.</i> R.C.E. Devenish, C.D. Froggatt,	(BNL, MICH)
DEVENISH	74B	NP B81 330		B.R. Martin (DESY+)
LICHTENBERG Also	74	PR D10 3865 Private Comm.	D.B. Lichtenberg D.B. Lichtenberg	(IND) (IND)
HABIBI	73	Thesis Nevis 199	M. Habibi	(COLU)
Also		Purdue Conf. 387	C. Baltay <i>et al.</i>	(COLU, BING)
MAST	73	PR D7 3212	T.S. Mast <i>et al.</i>	(LBL) IJP
Also		PR D7 5	T.S. Mast <i>et al.</i>	(LBL) IJP
THOMAS	73	NP B56 15	D.W. Thomas <i>et al.</i>	(ČMU)́ JP
AGUILAR	72B	PR D6 29	M. Aguilar-Benitez <i>et al.</i>	(BNL)
COLLEY	71B	NP B31 61	D.C. Colley <i>et al.</i> M. Aguilar-Benitez <i>et al.</i>	(BIRM, EDIN, GLAS+)
AGUILAR	70B	PRL 25 58		(BNL, SYRA)
PAN	69	PRL 23 808	Y.L. Pan, F.L. Forman	(PENN) I
SIEGEL	67	Thesis UCRL 18041	D.M. Siegel	
BIRMINGHAM LONDON		PR 152 1148 PR 143 1034		(LRL) RM, GLAS, LOIC, OXF+) (BNL, SYRA) J
ARMENTEROS	65B	PL 19 75	R. Armenteros <i>et al.</i>	(CERN, HEID, SACL)
SMITH	65	Thesis UCLA	L.T. Smith	(UCLA)
COOPER	64	PL 8 365	W.A. Cooper <i>et al.</i> D.O. Huwe	(CERN, AMST)
HUWE	64	Thesis UCRL 11291		(LRL) JP
Also CURTIS ALSTON BASTIEN DAHL ELY	63 62 61 61	PR 181 1824 PR 132 1771 CERN Conf. 311 PRL 6 702 PRL 6 142 PRL 7 461	D.O. Huwe L.J. Curtis et al. M.H. Alston et al. P.L. Bastien, M. Ferro-Luzzi, A. O.I. Dahl et al. R.P. Ely et al.	(LRL) (MICH) J (LRL) H. Rosenfeld (LRL) (LRL) (LRL) J
ALSTON	60	PRL 5 520	M.H. Alston <i>et al.</i>	(LRL) I

 $^{^8\,{\}rm Results}$ from $\Lambda\pi^+\pi^-$ and $\Lambda\pi^+\pi^-\pi^0$ combined by us.

⁹ The error is enlarged to $4\Gamma/\sqrt{N}$. See the note on the $K^*(892)$ mass in the 1984 edition.

 $^{^{10}}$ Consistent with +, 0, and - widths equal.

The consistent with \pm , 0, and \pm with \pm 0, and \pm with \pm 0.11 KELLER 12 gives $\Gamma(\Sigma^+\gamma)/\Gamma(\Sigma^+\pi^0)=(11.95\pm 2.21^{+0.53}_{-1.21})\%$, using 1/2 our total $\Sigma(1385) \to \Sigma \pi$ fraction for $\Sigma^+ \pi^0$. We divide the KELLER 12 value by two. ¹² We calculate this from the MOLCHANOV 04 upper limit of 9.5 keV on the $\Sigma^- \gamma$ width.

 $^{^{13}}$ We calculate this from the ARIK 77 upper limit of 24 keV on the $\Sigma^-\gamma$ width.

¹⁴ An extrapolation of the parametrized amplitude below threshold.