$\Sigma(1750) \ 1/2^-$

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

For most results published before 1974 (they are now obsolete), see our 1982 edition Physics Letters **111B** 1 (1982).

There is evidence for this state in many partial-wave analyses, but with wide variations in the mass, width, and couplings. The latest analyses indicated significant couplings to $N\overline{K}$ and $\Lambda\pi$, as well as to Σn whose threshold is at 1746 MeV (JONES 74).

		Σ(1750) POLE P	OSITI	ON	
REAL PA		DOCUMENT ID)	TECN	COMMENT
		owing data for averag	es, fits,	limits, e	etc. • • •
1704^{+3}_{-6}		$^{ m 1}$ KAMANO	15	DPWA	Multichannel
1708		ZHANG	13A	DPWA	Multichannel
¹ From the 1551 + 2	he preferred solution 2_9 MeV and 2_9	on A in KAMANO 19 $\frac{-2}{2}$ MeV.	5. Solu	ition B r	eports two poles at M =
-2×IMA	GINARY PART				
VALUE (MeV)		DOCUMENT ID			COMMENT
	do not use the follo	owing data for averag	es, tits,	limits, e	etc. • • •
$86 + 14 \\ -4$		$^{ m 1}$ KAMANO	15	DPWA	Multichannel
158		ZHANG	13A	DPWA	Multichannel
			. Solut	ion B Re	ports two poles with Γ =
	$\frac{2}{2}$ and $\frac{172}{4}$ MeV				ports two poles with Γ =
376	2 and 172 + 4 Me\	<i>V</i> .	ESIDU	JES	
376 ± 1;	2 and 172 ⁺⁴ Me\	ν. Σ(1750) POLE R	ESIDU	JES	
376 ± 15	and 172 ⁺⁴ Me\ ne normalized resided residue in NI PHASE (°)	Σ (1750) POLE R due is the residue divis $\overline{K} o \Sigma$ (1750) $ o$	ESIDU ded by NK	JES Γ _{pole} /2.	COMMENT
376 ± 12	and 172 ⁺⁴ Me\ ne normalized resided residue in NI PHASE (°)	Σ (1750) POLE R due is the residue divisor $\overline{K} \rightarrow \Sigma$ (1750) \rightarrow DOCUMENT	ESIDU ded by NK	JES $\Gamma_{pole}/2$ $TECN$ limits, ϵ	COMMENT
376 ± 15 Normalize MODULUS • • • We co	and 172 ⁺⁴ ₂ MeN ne normalized resided residue in N PHASE (°) do not use the follo	Σ (1750) POLE R due is the residue divided $\overline{K} \rightarrow \Sigma$ (1750) \rightarrow DOCUMENT powing data for average	ESIDU ded by NK ID es, fits,	JES $\Gamma_{pole}/2$ $TECN$ limits, ϵ	
376 ± 1.5 Normalize MODULUS • • • We co 0.0982 ¹ From th	and 172 ⁺⁴ MeN me normalized resided residue in NT PHASE (°) do not use the following preferred solution	Σ (1750) POLE R due is the residue dividence $\overline{K} \rightarrow \Sigma$ (1750) \rightarrow DOCUMENT powing data for average 1 KAMANO 15	ESIDU ded by NK ID es, fits, 15	JES $\Gamma_{pole}/2$ $TECN$ limits, ϵ	
Normalize MODULUS • • • We considered to the second seco	and 172 ⁺⁴ MeN me normalized resided residue in NT PHASE (°) do not use the following preferred solution	Σ (1750) POLE R The due is the residue divided by Σ (1750) \rightarrow Σ DOCUMENT to bowing data for average Σ KAMANO	ESIDU MK //D es, fits, 15	JES $\Gamma_{pole}/2$ $TECN$ limits, ϵ	
Normalize MODULUS • • • We considered to the second seco	and 172 ⁺⁴ MeNe ne normalized residue in No	Σ (1750) POLE R due is the residue divided $\overline{K} \to \Sigma$ (1750) $\to DOCUMENT$ owing data for average 1 KAMANO 15 $\overline{K} \to \Sigma$ (1750) \to	ESIDU ded by NK ID es, fits, 15 . Σπ	JES Γ _{pole} /2. <u>TECN</u> limits, ε DPW	COMMENT etc. • • • A Multichannel COMMENT
Normalize MODULUS • • • We considered to the second seco	and 172 ⁺⁴ MeNe ne normalized residue in No	Let Σ (1750) POLE Reduce is the residue divided by $\overline{K} \rightarrow \Sigma$ (1750) $\rightarrow DOCUMENT$ by Dowing data for average 1 KAMANO on A in KAMANO 15 $\overline{K} \rightarrow \Sigma$ (1750) $\rightarrow DOCUMENT$	ESIDU ded by NK ID es, fits, 15 . Σπ	JES $\Gamma_{pole}/2$ $\frac{TECN}{\text{limits, } \epsilon}$ $\frac{TECN}{\text{limits, } \epsilon}$	COMMENT etc. • • • A Multichannel COMMENT

Normalized residue in $N\overline{K} \rightarrow \Sigma(1750) \rightarrow \Lambda\pi$

MODULUS	PHASE (°)	DOCUMENT ID		TECN	COMMENT	
• • • We do r	not use the following d	ata for averages,	fits,	imits, et	c. • • •	
0.207	169	$^{ m 1}$ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in KAMANO 15.						

Normalized residue in $N\overline{K} \to \Sigma(1750) \to \Sigma(1385)\pi$, D-wave

MODULUS	PHASE (°)	DOCUMENT ID	TECN	COMMENT	
• • • We do	o not use the fo	ollowing data for averages, fits,	limits, etc	c. • • •	
0.0536	73	¹ KAMANO 15	DPWA	Multichannel	

¹From the preferred solution A in KAMANO 15.

Σ(1750) MASS

VALUE (MeV)	DOCUMENT ID	1	TECN	COMMENT
1730 to 1800 (≈	1750) OUR ESTIMATE			
$1739\pm$ 8	ZHANG	13A	DPWA	Multichannel
1756 ± 10	GOPAL	80		$\overline{K}N \rightarrow \overline{K}N$
1770 ± 10	ALSTON	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
1770 ± 15	GOPAL	77	DPWA	$\overline{K}N$ multichannel
• • • We do not	use the following data for averag	es, fits,	limits, e	tc. • • •
1800 or 1813	_	77	DPWA	$\overline{K}N$ multichannel
1715 ± 10	² CARROLL			Isospin-1 total σ
1730	DEBELLEFO	N 76	IPWA	$K^- p \rightarrow \Lambda \pi^0$
1780 ± 30	BAILLON	75	IPWA	$\overline{K}N \rightarrow \Lambda\pi \text{ (sol. 1)}$
1700 ± 30	BAILLON	75	IPWA	$\overline{K}N \rightarrow \Lambda\pi \text{ (sol. 2)}$
1697^{+20}_{-10}	VANHORN	75	DPWA	$K^- p \rightarrow \Lambda \pi^0$
1785 ± 12	CHU	74	DBC	Fits $\sigma(K^- n \to \Sigma^- \eta)$
1760 ± 5	³ JONES	74	HBC	Fits $\sigma(K^- p \rightarrow \Sigma^0 \eta)$
1739 ± 10	PREVOST	74	DPWA	$K^- N \rightarrow \Sigma(1385) \pi$
4				

 $^{^1}$ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit. 2 A total cross-section bump with (J+1/2) $\Gamma_{\rm el}$ / $\Gamma_{\rm total}$ = 0.30.

Σ(1750) WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
60 to 160 (≈ 90) OUR ESTIMATE				
182 ± 60	ZHANG	13A	DPWA	Multichannel
64 ± 10	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
161 ± 20	ALSTON	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
60 ± 10	GOPAL	77	DPWA	$\overline{K}N$ multichannel

 $^{^3}$ An S-wave Breit-Wigner fit to the threshold cross section with no background and errors statistical only.

• • • We do not use the following data for averages, fits, limits, etc. • • •

117 or 119	$^{ m 1}$ MARTIN	77	DPWA $\overline{K}N$ multichannel
10	² CARROLL	76	DPWA Isospin-1 total σ
110			IPWA $K^-p \rightarrow \Lambda \pi^0$
140 ± 30	BAILLON	75	IPWA $\overline{K}N \rightarrow \Lambda\pi$ (sol. 1)
160 ± 50	BAILLON	75	IPWA $\overline{K}N \rightarrow \Lambda\pi$ (sol. 2)
66^{+14}_{-12}	VANHORN	75	DPWA $K^-p \rightarrow \Lambda \pi^0$
89 ± 33	CHU	74	DBC Fits $\sigma(K^- n \rightarrow \Sigma^- \eta)$
92± 7	³ JONES	74	HBC Fits $\sigma(K^- p \rightarrow \Sigma^0 \eta)$
108 ± 20	PREVOST	74	DPWA $K^-N \rightarrow \Sigma(1385)\pi$

 $^{^{1}}_{}$ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

Σ (1750) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
$\overline{\Gamma_1}$	NK	10–40 %
Γ_2	$\Lambda\pi$	seen
Γ_3	$\Sigma \pi$	<8 %
Γ_4	$\Sigma \eta$	15–55 %
Γ_5	$\Sigma(1385)\pi$, $ extit{D}$ -wave	
Γ_6	$\Lambda(1520)\pi$	
	$N\overline{K}^*(892), S=1/2$	(8±4) %
Γ ₈	$N\overline{K}^*(892)$, $S=3/2$, D -wave	

Σ (1750) BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on \varLambda and \varSigma Resonances.

$\Gamma(N\overline{K})/\Gamma_{\text{total}}$					Γ_1/Γ
VALUE	DOCUMENT ID		TECN	COMMENT	
0.1 to 0.4 OUR ESTIMATE					
0.09 ± 0.07	ZHANG	13A	DPWA	Multichannel	
0.14 ± 0.03	GOPAL	80	DPWA	$\overline{K} N \rightarrow \overline{K} N$	
0.33 ± 0.05	ALSTON	78	DPWA	$\overline{K} N \rightarrow \overline{K} N$	
• • We do not use the following data for averages, fits, limits, etc. • •					
0.154	$^{ m 1}$ KAMANO	15	DPWA	Multichannel	
0.15 ± 0.03				See GOPAL 80	
0.06 or 0.05	² MARTIN	77	DPWA	$\overline{K}N$ multichanne	l
1 C Also must must salution A :	I/ A N A N I O 1 F				

 $^{^{}m 1}$ From the preferred solution A in KAMANO 15.

² A total cross-section bump with (J+1/2) $\Gamma_{\rm el}$ / $\Gamma_{\rm total}$ = 0.30.

³ An *S*-wave Breit-Wigner fit to the threshold cross section with no background and errors statistical only.

²The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

$\Gamma(\Lambda\pi)/\Gamma_{\text{total}}$				Γ ₂ ,	/Г
<u>VALUE</u>	DOCUMENT ID			COMMENT	_
• • • We do not use the following of	_				
0.435	¹ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
$\Gamma(\Sigma\pi)/\Gamma_{total}$				Г ₃ ,	/Г
VALUE	DOCUMENT ID		TECN		-
• • We do not use the following of					
0.373	¹ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
$\Gamma(\Sigma(1385)\pi$, <i>D</i> -wave $)/\Gamma_{\sf total}$				Г _{5,}	/Г
VALUE	DOCUMENT ID		TECN	••	•
• • We do not use the following of	·			·	
0.024	¹ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
「(N\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				F_	/ C
$\Gamma(N\overline{K}^*(892), S=1/2)/\Gamma_{\text{total}}$	DOCUMENT ID		TECN	Γ ₇ ,	/ I
<u>VALUE</u> 0.08 ±0.04	<u>DOCUMENT ID</u> ZHANG			<u>COMMENT</u> Multichannel	_
• • • We do not use the following of	_				
	¹ KAMANO	15		Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
·				_	,_
$\Gamma(N\overline{K}^*(892), S=3/2, D-wave)$				Г ₈ ,	/I
VALUE	DOCUMENT ID				
• • We do not use the following of					
	¹ KAMANO	15	DPWA	Multichannel	
¹ From the preferred solution A in	KAMANO 15.				
$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N\overline{K} \to \Sigma (17)^{1/2}$	$(50) \rightarrow \Lambda \pi$			(Γ ₁ Γ ₂) ^{1/2} /	/Г
VALUE	DOCUMENT ID		TECN		_
$+0.10 \pm 0.04$	ZHANG			Multichannel	
$0.04\ \pm0.03$	GOPAL	77	DPWA	$\overline{K}N$ multichannel	
• • • We do not use the following of	data for averages	, fits,	limits, e	etc. • • •	
-0.10 or -0.09	¹ MARTIN	77	DPWA	$\overline{K}N$ multichannel	
-0.12	DEBELLEFON	76		$K^- p \rightarrow \Lambda \pi^0$	
$-0.12\ \pm0.02$	BAILLON	75		$\overline{K} N \to \Lambda \pi \text{ (sol. 1)}$	
-0.13 ± 0.03	BAILLON	75		$\overline{K}N \rightarrow \Lambda\pi \text{ (sol. 2)}$	
-0.13 ± 0.04	VANHORN	75	DPWA	$K^- p \rightarrow \Lambda \pi^0$	
-0.120 ± 0.077	DEVENISH	74 B		Fixed-t dispersion rel.	
$^{ m 1}$ The two MARTIN 77 values are	from a T-matrix	pole	and fro	m a Breit-Wigner fit.	

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N\overline{K} \to \Sigma (1)$.750) → Σπ			$(\Gamma_1\Gamma_3)^{\frac{1}{2}}/\Gamma$	
VALUE	DOCUMENT ID		TECN	COMMENT	
$+0.17\pm0.07$	ZHANG	13A	DPWA	Multichannel	
$-0.09\!\pm\!0.05$	GOPAL	77	DPWA	$\overline{K}N$ multichannel	
• • • We do not use the following	data for averages	s, fits,	limits, e	tc. • • •	
$+0.06 \text{ or } +0.06 \\ 0.13 \pm 0.02$				$\overline{K}N$ multichannel $\overline{K}N$ multichannel	
$^{ m 1}$ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.					
$(\Gamma_i \Gamma_f)^{\frac{1}{2}} / \Gamma_{\text{total}} \text{ in } N\overline{K} \to \Sigma$.750) → Ση <u>DOCUMENT ID</u>		<u>TECN</u>	$(\Gamma_1\Gamma_4)^{\frac{1}{2}}/\Gamma$	

¹ JONES 74 HBC • • • We do not use the following data for averages, fits, limits, etc. •

seen DBC Threshold bump

 $^{
m 1}$ An S-wave Breit-Wigner fit to the threshold cross section with no background and errors

statistical only.

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N \overline{K} \to \Sigma$	$\Sigma(1750) \rightarrow \Sigma(138)$	$5)\pi$,	D-wave	$(\Gamma_1\Gamma_5)^{\frac{1}{2}}/\Gamma$
VALUE	DOCUMENT ID		TECN	COMMENT
$+0.17\pm0.07$	ZHANG	13A	DPWA	Multichannel
$+0.18\pm0.15$	PREVOST	74	DPWA	$K^- N \rightarrow \Sigma(1385) \pi$

 $(\Gamma_1\Gamma_6)^{\frac{1}{2}}/\Gamma$ $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N \overline{K} \rightarrow \Sigma (1750) \rightarrow \Lambda (1520) \pi$ VALUE

DOCUMENT ID

TECN
COMMENT • • • We do not use the following data for averages, fits, limits, etc. • • •

 0.032 ± 0.021 **CAMERON** DPWA P-wave decay

Σ (1750) REFERENCES

GOPAL 77 NP B119 362 G.P. Gopal et al. (LOIC, RHEL) IJP MARTIN 77 NP B127 349 B.R. Martin, M.K. Pidcock, R.G. Moorhouse (LOUC+) IJP Also NP B126 266 B.R. Martin, M.K. Pidcock (LOUC) Also NP B126 285 B.R. Martin, M.K. Pidcock (LOUC) IJP CARROLL 76 PRL 37 806 A.S. Carroll et al. (BNL) I DEBELLEFON 76 NP B109 129 A. de Bellefon, A. Berthon (CDEF) IJP BAILLON 75 NP B94 39 P.H. Baillon, P.J. Litchfield (CERN, RHEL) IJP VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP Also NP B87 157 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID) LANCREIN 72 NP B47 477 W. Lancklein, E. Warner (MPIM) IJP	KAMANO ZHANG PDG GOPAL ALSTON Also CAMERON	15 13A 82 80 78	PR C92 025205 PR C88 035205 PL 111B 1 Toronto Conf. 159 PR D18 182 PRL 38 1007 NP B131 399	H. Kamano et al. H. Zhang et al. M. Roos et al. G.P. Gopal M. Alston-Garnjost et al. M. Alston-Garnjost et al. W. Cameron et al.	(ANL, OSAK) (KSU) (HELS, CIT, CERN) (RHEL) IJP (LBL, MTHO+) IJP (LBL, MTHO+) IJP (RHEL, LOIC) IJP
Also NP B126 266 B.R. Martin, M.K. Pidcock (LOUC) Also NP B126 285 B.R. Martin, M.K. Pidcock (LOUC) IJP CARROLL 76 PRL 37 806 A.S. Carroll et al. (BNL) I DEBELLEFON 76 NP B109 129 A. de Bellefon, A. Berthon (CDEF) IJP BAILLON 75 NP B87 39 P.H. Baillon, P.J. Litchfield (CERN, RHEL) IJP VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	GOPAL	77	NP B119 362	G.P. Gopal et al.	(LOIC, RHEL) IJP
Also	MARTIN	77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G	. Moorhouse (LOUC+) IJP
CARROLL 76 PRL 37 806 A.S. Carroll et al. (BNL) I DEBELLEFON 76 NP B109 129 A. de Bellefon, A. Berthon (CDEF) IJP BAILLON 75 NP B94 39 P.H. Baillon, P.J. Litchfield (CERN, RHEL) IJP VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP Also NP B87 157 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	Also		NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC)
DEBELLEFON 76 NP B109 129 A. de Bellefon, A. Berthon (CDEF) IJP BAILLON 75 NP B94 39 P.H. Baillon, P.J. Litchfield (CERN, RHEL) IJP VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP Also NP B87 157 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	Also		NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP
BAILLON 75 NP B94 39 P.H. Baillon, P.J. Litchfield (CERN, RHEL) IJP VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP Also NP B87 157 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	CARROLL	76	PRL 37 806	A.S. Carroll et al.	(BNL) I
VANHORN 75 NP B87 145 A.J. van Horn (LBL) IJP Also NP B87 157 A.J. van Horn (LBL) IJP CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	DEBELLEFON	76	NP B109 129	A. de Bellefon, A. Berthon	(ČDEF) IJP
Also	BAILLON	75	NP B94 39	P.H. Baillon, P.J. Litchfield	(CERN, RHEL) IJP
CHU 74 NC 20A 35 R.Y.L. Chu et al. (PLAT, TUFTS, BRAN) IJP DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	VANHORN	75	NP B87 145	A.J. van Horn	(LBL) IJP
DEVENISH 74B NP B81 330 R.C.E. Devenish, C.D. Froggatt, B.R. Martin (DESY+) JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	Also		NP B87 157	A.J. van Horn	(LBL) IJP
JONES 74 NP B73 141 M.D. Jones (CHIC) IJP PREVOST 74 NP B69 246 J. Prevost <i>et al.</i> (SACL, CERN, HEID)	CHU	74	NC 20A 35	R.Y.L. Chu et al.	(PLAT, TUFTS, BRAN) IJP
PREVOST 74 NP B69 246 J. Prevost et al. (SACL, CERN, HEID)	DEVENISH	74B	NP B81 330	R.C.E. Devenish, C.D. Froggatt,	B.R. Martin (DESY+)
•	JONES	74	NP B73 141	M.D. Jones	(CHIC) IJP
LANCREIN 72 ND R47 477 W. Langhain E. Wagner (MDIM) LID	PREVOST	74	NP B69 246	J. Prevost <i>et al.</i>	(SACL, CERN, HEID)
LANGBEIN 12 IN D41 411 VV. Langbein, 1. Wagner (IVII IVI) ISI	LANGBEIN	72	NP B47 477	W. Langbein, F. Wagner	(MPIM) IJP
CLINE 69 LNC 2 407 D. Cline, R. Laumann, J. Mapp (WISC)	CLINE	69	LNC 2 407	D. Cline, R. Laumann, J. Mapp	(WISC)