$\Lambda(1820) 5/2^{+}$

 $I(J^P) = 0(\frac{5}{2}^+)$ Status: ***

This resonance is the cornerstone for all partial-wave analyses in this region. Most of the results published before 1973 are now obsolete and have been omitted. They may be found in our 1982 edition Physics Letters $\mathbf{111B}$ 1 (1982).

Most of the quoted errors are statistical only; the systematic errors due to the particular parametrizations used in the partial-wave analyses are not included. For this reason we do not calculate weighted averages for the mass and width.

	/	(1820) POLE PO	SITI	ON	
REAL PART	Γ	DOCUMENT ID		TECN	COMMENT
1824 ⁺²		1 KAMANO	15	DPWA	Multichannel
• • We do	not use the follow	ving data for average	s, fits,	limits, e	etc. • • •
1814		ZHANG	13A	DPWA	Multichannel
$^{\mathrm{1}}$ From the	preferred solution	A in KAMANO 15.			
–2×IMAGI	NARY PART				
VALUE (MeV)		DOCUMENT ID 1 KAMANO		TECN	COMMENT
77±2					
	not use the follow	ring data for average	s, fits,	limits, e	etc. • • •
35		ZHANG	13A	DPWA	Multichannel
1 From the	preferred solution	A in KAMANO 15.			
	Λ	(1820) POLE RE	SIDU	IES	
The		e is the residue divide			
Normalized	residue in $N\overline{K}$	→ Λ(1820) →	ΝK		
MODULUS		DOCUMENT		TECI	V COMMENT
• • We do	not use the follow	ing data for average	s, fits,	limits, e	etc. • • •
).558	-13	$^{ m 1}$ KAMANO	1	5 DPV	VA Multichannel
$^{ m 1}$ From the	preferred solution	A in KAMANO 15.			
			_		
		→ Λ(1820) →			
MODULUS	PHASE (°)	<u>DOCUMENT</u>		<u>TECI</u>	_
		ving data for averages			
).357	168	¹ KAMANO	1	5 DPV	VA Multichannel
¹ From the	preferred solution	A in KAMANO 15.			

Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow \Lambda\eta$	
		DOCUMENT ID	TECN COMMENT
• • • We do	not use the following	data for averages, fits	, limits, etc. • • •
0.0184	-3	¹ KAMANO 15	DPWA Multichannel
$^{ m 1}$ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	Λ(1820) → Ξ K	
		DOCUMENT ID	TECN COMMENT
		data for averages, fits	
0.00111	70	¹ KAMANO 15	DPWA Multichannel
$^{ m 1}$ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow \Sigma(13)$	385)π, <i>P</i> -wave
MODULUS	PHASE (°)	DOCUMENT ID	TECN COMMENT
• • • We do	not use the following	data for averages, fits	
0.340	161	¹ KAMANO 15	DPWA Multichannel
$^{ m 1}$ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow \Sigma(13)$	$(885)\pi$, F -wave
		DOCUMENT ID	
• • • We do	not use the following	data for averages, fits	, limits, etc. • • •
0.201	151	¹ KAMANO 15	DPWA Multichannel
$^{ m 1}$ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow N\overline{K}^*$	*(892), <i>S</i> =1/2 , <i>F</i> -wave
		DOCUMENT ID	
• • • We do	not use the following	data for averages, fits	
0.00750	41		DPWA Multichannel
¹ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow N\overline{K}^*$	*(892), <i>S</i> =3/2 , <i>P</i> -wave
			TECN COMMENT
		data for averages, fits	
0.171	-139	¹ KAMANO 15	DPWA Multichannel
$^{ m 1}$ From the	preferred solution A	in KAMANO 15.	
Normalized	residue in $N\overline{K} \rightarrow$	$\Lambda(1820) \rightarrow N\overline{K}^*$	*(892), <i>S</i> =3/2 , <i>F</i> -wave
MODULUS	PHASE (°)	DOCUMENT ID	* *
• • • We do	not use the following	data for averages, fits	, limits, etc. • • •
0.000517	161	¹ KAMANO 15	DPWA Multichannel
1 From the	preferred solution A	in KAMANO 15.	

Λ(1820) MASS

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
1815 to 1825 (≈ 1820) OUR EST	IMATE			
1823.5 ± 0.8	ZHANG	13A	DPWA	Multichannel
1823 ± 3	GOPAL	80	DPWA	$\overline{K} N \rightarrow \overline{K} N$
1819 ± 2	ALSTON	78	DPWA	$\overline{K} N \rightarrow \overline{K} N$
1822 ± 2	GOPAL	77	DPWA	$\overline{K}N$ multichannel
1821 ± 2	KANE	74	DPWA	$K^-p \rightarrow \Sigma \pi$
ullet $ullet$ We do not use the following	data for averages	s, fits,	limits, e	etc. • • •
1830	DECLAIS			
1817 or 1819	¹ MARTIN	77	DPWA	$\overline{K}N$ multichannel
$^{ m 1}$ The two MARTIN 77 values are	e from a T-matrix	x pole	and fro	m a Breit-Wigner fit.

Λ(1820) WIDTH

VALUE (MeV)	DOCUMENT ID		TECN	COMMENT
70 to 90 (≈ 80) Ol	JR ESTIMATE			
89 ± 2	ZHANG	13A	DPWA	Multichannel
77 ± 5	GOPAL	80	DPWA	$\overline{K}N \rightarrow \overline{K}N$
72 ± 5	ALSTON	78	DPWA	$\overline{K}N \rightarrow \overline{K}N$
81 ± 5	GOPAL	77	DPWA	$\overline{K}N$ multichannel
87 ± 3	KANE	74	DPWA	$K^- p \rightarrow \Sigma \pi$
• • • We do not us	se the following data for averages	s, fits,	limits, e	tc. • • •
82	DECLAIS	77	DPWA	$\overline{K}N \rightarrow \overline{K}N$
76 or 76	¹ MARTIN	77	DPWA	$\overline{K}N$ multichannel
1				5

¹ The two MARTIN 77 values are from a T-matrix pole and from a Breit-Wigner fit.

∧(1820) DECAY MODES

	Mode	Fraction (Γ_i/Γ)
$\overline{\Gamma_1}$	NK	55–65 %
Γ_2	$\Sigma \pi$	8–14 %
Γ ₃	$\Sigma(1385)\pi$	5–10 %
Γ_4	$arSigma(1385)\pi$, $ extit{\it P}$ -wave	
Γ_5	$oldsymbol{\Sigma}(1385)\pi$, $\emph{F} ext{-}$ wave	
Γ_6	$\Lambda\eta$	
Γ_7	ΞK	
Γ ₈	$\Sigma \pi \pi$	
Γ ₉	$N\overline{K}^*(892)$, $S=1/2$, F -wave	
Γ_{10}	$N\overline{K}^*(892)$, $S=3/2$, P -wave	(3.0 ± 1.0) %
Γ ₁₁	$N\overline{K}^*(892)$, $S=3/2$, F -wave	

Λ(1820) BRANCHING RATIOS

Errors quoted do not include uncertainties in the parametrizations used in the partial-wave analyses and are thus too small. See also "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances.

$\Gamma(N\overline{K})/\Gamma_{\text{total}}$					Γ ₁ /Γ
VALUE	DOCUMENT ID		<u>TECN</u>	COMMENT	
0.55 to 0.65 OUR ESTIMATE 0.54 ±0.01	ZHANG	12 _^	DDWA	Multichannel	
0.54 ± 0.01 0.58 ± 0.02	GOPAL	80		$\overline{K}N \rightarrow \overline{K}N$	
0.60 ±0.03	ALSTON	78		$\overline{K}N \to \overline{K}N$	
• • • We do not use the following of					
_	¹ KAMANO	,,, 15		Multichannel	
0.51				$\overline{K}N \rightarrow \overline{K}N$	
0.51 0.57 ± 0.02				See GOPAL 80	
	² MARTIN	77	DDW/A	$\overline{K}N$ multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
² The two MARTIN 77 values are	from a T-matrix	c pole	and fro	m a Breit-Wigner f	ït.
$\Gamma(\Sigma\pi)/\Gamma_{total}$					Γ_2/Γ
VALUE	DOCUMENT ID		TECN	COMMENT	
• • • We do not use the following of	data for averages	, fits,	limits, e	etc. • • •	
_	¹ KAMANO			Multichannel	
1 From the preferred solution A in	_		2		
$\Gamma(Σ(1385)π, P ext{-wave})/\Gamma_{ ext{total}}$					Γ ₄ /Γ
VALUE	DOCUMENT ID				
• • • We do not use the following of	data for averages	, fits,	limits, e	etc. • • •	
0.173	¹ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
$\Gamma(\Sigma(1385)\pi$, <i>F</i> -wave $)/\Gamma_{total}$					Γ ₅ /Γ
VALUE	DOCUMENT ID		TECN	COMMENT	
• • • We do not use the following of	data for averages	, fits,	limits, e	etc. • • •	
_	¹ KAMANO	15		Multichannel	
1 From the preferred solution A in	_		2		
·					Г. /Г
$\Gamma(\Lambda\eta)/\Gamma_{\text{total}}$	DOCUMENT ID		TECN	COLUMENT	Γ_6/Γ
VALUE	DOCUMENT ID			COMMENT	
• • • We do not use the following of					
0.001	¹ KAMANO	15	DPWA	Multichannel	
$^{ m 1}$ From the preferred solution A in	KAMANO 15.				
$\Gamma(\Xi K)/\Gamma_{total}$					Γ ₇ /Γ
VALUE	DOCUMENT ID		TECN	COMMENT	
• • • We do not use the following of	data for averages	, fits,	limits, e	etc. • • •	
	¹ KAMANO	15		Multichannel	
1 From the preferred solution A in		-	•		
From the preferred solution A in	MAIVIANU 15.				
HTTP://PDG.LBL.GOV	Page 4		Creat	ed: 5/30/2017	17:20

$\Gamma(\Sigma\pi\pi)/\Gamma_{total}$				Г ₈
VALUE				COMMENT
no clear signal				$K^- N \rightarrow \Sigma \pi \pi$
1 There is a suggestion of a $\Sigma(1385) ightarrow \Sigma \pi$ decay.	bump, enough to be	consi	stent wi	th what is expected fr
$\Gamma(N\overline{K}^*(892), S=1/2, F-w$	•			Гд
VALUE	-			COMMENT
• • • We do not use the follow				
not seen	¹ KAMANO	15	DPWA	Multichannel
¹ From the preferred solution	n A in KAMANO 15.			
$\Gamma(N\overline{K}^*(892), S=3/2, P-w$	$v_{ave})/\Gamma_{total}$			Γ ₁₀
VALUE			TECN	COMMENT
0.03 ± 0.01	ZHANG			Multichannel
• • • We do not use the follow	-	s, fits,	limits, e	etc. • • •
0.006	¹ KAMANO	15	DPWA	Multichannel
$^{ m 1}$ From the preferred solution	n A in KAMANO 15.			
$\Gamma(N\overline{K}^*(892), S=3/2, F-w$	$_{\rm vave})/\Gamma_{\rm total}$			Г ₁₁
VALUE	*		TECN	COMMENT
• • • We do not use the follow	wing data for averages	s, fits,	limits, e	etc. • • •
not seen	¹ KAMANO	15	DPWA	Multichannel
$^{ m 1}$ From the preferred solution	n A in KAMANO 15.			
				(Γ ₁ Γ ₂) ^{1/2}
¹ From the preferred solution $(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N \overline{K} \rightarrow N \overline{K} \rightarrow N \overline{K}$			<u>TECN</u>	$(\Gamma_1\Gamma_2)^{\frac{1}{2}}$
$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N \overline{K} \to K$	$\Lambda(1820) \rightarrow \Sigma \pi$			\/
$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N \overline{K} \rightarrow K$ $VALUE$ -0.28 ± 0.01	$\Lambda(1820) \rightarrow \Sigma \pi$	13A	DPWA DPWA	$\frac{COMMENT}{Multichannel}$ $\overline{K}N \text{ multichannel}$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ $VALUE$ -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01	Λ(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE	13A 77 74	DPWA DPWA DPWA	$\frac{COMMENT}{\text{Multichannel}}$ $\overline{K} \text{ N multichannel}$ $K^- p \rightarrow \Sigma \pi$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the follows	Λ(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages	13A 77 74 s, fits,	DPWA DPWA DPWA limits, 6	$\frac{COMMENT}{M}$ Multichannel $\overline{K}N \text{ multichannel }$ $K^-p \to \Sigma\pi$ etc. • •
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow N\overline{K}$ VALUE -0.28 ± 0.01 -0.28 ± 0.01 • • • We do not use the follow $-0.25 \text{ or } -0.25$	Λ(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN	13A 77 74 s, fits,	DPWA DPWA DPWA limits, e	$\frac{COMMENT}{M}$ Multichannel $\overline{K}N \text{ multichannel}$ $K^-p \to \Sigma\pi$ etc. $\bullet \bullet \bullet$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the follows	Λ(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN	13A 77 74 s, fits,	DPWA DPWA DPWA limits, e	$\frac{COMMENT}{M}$ Multichannel $\overline{K}N \text{ multichannel}$ $K^-p \to \Sigma\pi$ etc. $\bullet \bullet \bullet$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followord of the two MARTIN 77 value of the followord of the two MARTIN 77 value of the followord o	Λ (1820) $\rightarrow \Sigma \pi$ ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix Λ (1820) $\rightarrow \Sigma$ (138)	13A 77 74 s, fits, 77 × pole	DPWA DPWA limits, e DPWA and from	$\frac{COMMENT}{K}$ Multichannel $\frac{K}{K}N \text{ multichannel}$ $\frac{K}{K} = p \rightarrow \Sigma \pi$ etc. • • • • $\frac{K}{K}N \text{ multichannel}$ m a Breit-Wigner fit.
$\frac{\left(\Gamma_{i}\Gamma_{f}\right)^{\frac{1}{2}}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K}{VALUE}$ -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followow. $-0.25 \text{ or } -0.25$ $\frac{1}{1} \text{ The two MARTIN } 77 \text{ value}$ $\frac{\left(\Gamma_{i}\Gamma_{f}\right)^{\frac{1}{2}}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K}{VALUE}$	Λ (1820) $\rightarrow \Sigma \pi$ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix Λ (1820) $\rightarrow \Sigma$ (138)	13A 77 74 5, fits, 77 × pole	DPWA DPWA limits, e DPWA and from	$\frac{COMMENT}{K}$ Multichannel $\frac{K}{K}N \text{ multichannel}$ $\frac{K}{K} p \rightarrow \Sigma \pi$ etc. • • • $\frac{K}{K}N \text{ multichannel}$ m a Breit-Wigner fit. $\frac{(\Gamma_1 \Gamma_4)^{\frac{1}{2}}}{COMMENT}$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followord of the two MARTIN 77 value of the two MARTIN 7	Λ (1820) $\rightarrow \Sigma \pi$ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix Λ (1820) $\rightarrow \Sigma$ (138)	13A 77 74 5, fits, 77 × pole	DPWA DPWA limits, e DPWA and from	$\frac{COMMENT}{K}$ Multichannel $\frac{K}{K}N \text{ multichannel}$ $\frac{K}{K} p \rightarrow \Sigma \pi$ etc. • • • $\frac{K}{K}N \text{ multichannel}$ m a Breit-Wigner fit. $\frac{(\Gamma_1 \Gamma_4)^{\frac{1}{2}}}{COMMENT}$
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followon of the followork of the	Λ(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix Λ(1820) → Σ(138) DOCUMENT ID ZHANG 1 CAMERON	13A 77 74 s, fits, 77 × pole 5)π ,	DPWA DPWA limits, e DPWA and from P-wave TECN DPWA DPWA	$\frac{COMMENT}{K}$ Multichannel $\frac{K}{K}N \text{ multichannel}$ $\frac{K}{K} = p \rightarrow \Sigma \pi$ etc. • • • • $\frac{K}{K}N \text{ multichannel}$ m a Breit-Wigner fit.
$(\Gamma_i \Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow K$ VALUE -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followon of the followork of the	M(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix M(1820) → Σ(1389 DOCUMENT ID ZHANG 1 CAMERON PREVOST	13A 77 74 5, fits, 77 × pole 5)π, 13A 78	DPWA DPWA limits, 6 DPWA and from P-wave TECN DPWA DPWA DPWA	$\begin{array}{c} \underline{COMMENT} \\ \underline{Multichannel} \\ \overline{K} N \text{multichannel} \\ K^- p \rightarrow \Sigma \pi \\ \text{etc.} \bullet \bullet \\ \overline{K} N \text{multichannel} \\ \text{m a Breit-Wigner fit.} \\ \underline{COMMENT} \\ \underline{Multichannel} \\ K^- p \rightarrow \Sigma (1385) \pi \\ K^- N \rightarrow \Sigma (1385) \pi \end{array}$
$(\Gamma_i \Gamma_f)^{\frac{1}{2}}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow N\overline{K}$ $VALUE$ -0.28 ± 0.01 -0.28 ± 0.03 -0.28 ± 0.01 • • • We do not use the followord of the follow	M(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix M(1820) → Σ(138) DOCUMENT ID ZHANG 1 CAMERON PREVOST en changed to be in act M(1820) → Σ(138)	13A 77 74 s, fits, 77 x pole 5) π, 13A 78 74 ecord	DPWA DPWA limits, e DPWA and from P-wave TECN DPWA DPWA DPWA DPWA With the	Multichannel $\overline{K}N$ multichannel $K^-p \to \Sigma \pi$ etc. • • $\overline{K}N$ multichannel on a Breit-Wigner fit. $COMMENT$ Multichannel $K^-p \to \Sigma(1385)\pi$ $K^-N \to \Sigma(1385)\pi$ baryon-first convention $(\Gamma_1\Gamma_5)^{1/2}$
$(\Gamma_i \Gamma_f)^{\frac{1}{2}}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow N\overline{K}$ $VALUE$ -0.28 ± 0.01 -0.28 ± 0.01 $\bullet \bullet \bullet \text{ We do not use the followon}$ $-0.25 \text{ or } -0.25$ $1 \text{ The two MARTIN 77 value}$ $(\Gamma_i \Gamma_f)^{\frac{1}{2}}/\Gamma_{\text{total}} \text{ in } N\overline{K} \rightarrow N\overline{K}$ $VALUE$ -0.20 ± 0.02 -0.167 ± 0.054 $+0.27 \pm 0.03$	M(1820) → Σπ DOCUMENT ID ZHANG GOPAL KANE wing data for averages 1 MARTIN es are from a T-matrix M(1820) → Σ(138) DOCUMENT ID ZHANG 1 CAMERON PREVOST en changed to be in act M(1820) → Σ(138)	13A 77 74 s, fits, 77 x pole 5) π, 13A 78 74 ecord	DPWA DPWA limits, e DPWA and from P-wave TECN DPWA DPWA DPWA DPWA With the	$\begin{array}{c} \underline{COMMENT} \\ \underline{KN} \text{ multichannel} \\ \underline{KN} \text{ multichannel} \\ \underline{K^-p \rightarrow \Sigma\pi} \\ \text{etc.} \bullet \bullet \bullet \\ \hline \underline{KN} \text{ multichannel} \\ \text{m a Breit-Wigner fit.} \\ \underline{COMMENT} \\ \underline{Multichannel} \\ \underline{K^-p \rightarrow \Sigma(1385)\pi} \\ \underline{K^-N \rightarrow \Sigma(1385)\pi} \\ \text{baryon-first convention} \end{array}$

$(\Gamma_i \Gamma_f)^{1/2} / \Gamma_{\text{total}} \text{ in } N\overline{K} \to 1$	$(\Gamma_1\Gamma_6)^{\frac{1}{2}}/\Gamma$			
VALUE	DOCUMENT ID)	TECN	
$-0.096 ^{igoplus 0.040}_{-0.020}$	RADER	73	MPWA	

∧(1820) REFERENCES

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PDG	82	PL 111B 1	M. Roos et al.	(HELS, CIT, CERN)
GOPAL	80	Toronto Conf. 159	G.P. Gopal	` (RHEL)́ IJP
ALSTON	78	PR D18 182	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP
Also		PRL 38 1007	M. Alston-Garnjost et al.	(LBL, MTHO+) IJP
CAMERON	78	NP B143 189	W. Cameron et al.	(RHEL, LOIC) IJP
DECLAIS	77	CERN 77-16	Y. Declais <i>et al.</i>	(ČAEN, CERN) IJP
GOPAL	77	NP B119 362	G.P. Gopal <i>et al.</i>	(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
KANE	74	LBL-2452	D.F. Kane	(LBL) IJP
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RADER	73	NC 16A 178	R.K. Rader et al.	(SACL, HEID, CERN+)
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