^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Yu. Khazov, A. Rodionov and G. Shulyak	NDS 136, 163 (2016)	14-Jul-2016

$J^\pi(^{139}La)=7/2^+$.

1995Ba07,1995Ba57: ^{139}La(^{11}B,4nγ), E=45 MeV; measured Eγ, $\gamma\gamma$, $\gamma(\theta)$. ^{146}Sm; deduced levels, J^π. Tandem, GASP array.

1982Ro05: ^{139}La(^{11}B,4nγ), E=54 MeV; measured Eγ, Iγ, $\gamma\gamma$ coin, $T_{1/2}$ by RDM. ^{146}Sm; deduced levels, J^π, B(E2).

1998Bi11,1998Bi19,1999BiZX: ^{124}Sn(^{26}Mg,4nγ), E=108 MeV; measured mean lifetime by RDM. ^{146}Sm; deduced levels, double-octupole excitation. GASP array, plunger set-up.

The ^{146}Sm level scheme is constructed on the basis of γ spectra, $\gamma\gamma$ coincidences, angular asymmetries and $T_{1/2}$ measured in the (^{11}B,4nγ) and (^{26}Mg,4nγ) reactions. Double-octupole excitation is determined and band sequences are assigned in 1995Ba57 and 1998Bi11. The level scheme is identical with the ^{146}Sm level schemes obtained in the (α,xnγ) and (^{3}He,3nγ) reactions.

^{146}Sm Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]	E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[#]
0[a]	0^+		3567.2[e] 6	9^+		4628.5[d] 6	13^-	5.3 ps *+23−20*
747.2[a] 3	2^+	≤7.2 ps	3753.2 6	10^+		4752.1 6	13^+	
1380.7[b] 4	3^-		3774.5[e] 6	10^+		4969.1 6	14	
1380.8[a] 4	4^+	2 ps *+7−2*	3783.1[b] 6	11^-	10.0 ps *+38−33*	5144.1 8	(14)	
1811.2[a] 5	6^+	87 ps *+97−49*	3924.2 6	10^-		5205.8[c] 7	14^+	
2083.2[b] 5	5^-		4033.3[e] 6	11^+		5217.7[d] 6	15^-	
2222.1[e] 6	6^+		4091.1[d] 5	11^-	4.9 ps *+15−13*	5516.9 7	16	
2599.9[b] 5	7^-	10.4 ps *41*	4143.6 6	11^-		5614.1 8	(15)	
2736.7[a] 5	8^+	11.4 ps *41*	4144.7[a] 7			5696.7[c] 7	16^+	
2797.3[b] 5	9^-	0.69 ns *5*	4194.9[c] 6	12^+	10.4[&] ps *14*	5800.1 9		
3042.7[e] 6	8^+		4340.7 6	11^-		5871.1 9		
3166.5 5	8^-		4461.1 6	12^+[@]	≤5.8 ps	6176.7[c] 9	(18^+)	
3354.0[d] 5	9^-	26.9 ps *+45−40*	4579.5 6	12^-				

[†] From a least-squares fit to Eγ.

[‡] Assigned by 1995Ba07, 1995Ba57, 1982Ro05 on the basis of $\gamma(\theta)$, $T_{1/2}$ and systematics of N=84 nuclei as well as with data on $\gamma(\theta)$ and multipolarities from the (α,xnγ) and (^{3}He,3nγ) reactions.

[#] From RDM (1982Ro05), except as noted. Long-lived $T_{1/2}\approx$350 ps component was observed. This value may be attributed to the 5218 keV level (1982Ro05).

[@] J=12$^-$ in 'Adopted Levels, Gammas according to ^{144}Nd(α,2nγ) and ^{146}Nd(α,4nγ).

[&] From RDM (1998Bi11,1998Bi19).

[a] Band(A): Sequence of levels based on ground state, $J^\pi=0^+$.

[b] Band(B): Sequence of levels based on $J^\pi=3^-$ state. One octupole phonon coupled level sequence.

[c] Band(C): Sequence of levels based on $J^\pi=12^+$ state. Two octupole phonon coupled level sequence.

[d] Band(D): Sequence of levels based on $J^\pi=9^-$ state.

[e] Band(E): Sequence of levels based on $J^\pi=6^+$ state.

$\gamma(^{146}Sm)$

E$_\gamma$[†]	I$_\gamma$[#]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[&]	α[a]	I$_{(\gamma+ce)}$[@]	Comments
60.5[‡] 3	15.3 25	2797.3	9^-	2736.7	8^+	E1	1.059 *21*	31.5 *53*	ce(K)/(γ+ce)=0.428 *6*; ce(L)/(γ+ce)=0.0685 *15*; ce(M)/(γ+ce)=0.0147 *4* ce(N)/(γ+ce)=0.00325 *8*;

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

γ(^{146}Sm) (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α a	$I_{(\gamma+ce)}$ @	Comments
									ce(O)/(γ+ce)=0.000445 *10*; ce(P)/(γ+ce)=1.93×10^{-5} *4* α(K)=0.880 *17*; α(L)=0.141 *3*; α(M)=0.0303 *6* α(N)=0.00668 *14*; α(O)=0.000916 *18*; α(P)=3.98×10^{-5} *8* $I_{(\gamma+ce)}$: from intensity balance at 2797.3 keV level taking into account branching ratio of 986.0γ E3 (1995Ba57).
120.0 *5*		4461.1	12$^+$	4340.7	11$^-$				
137.0 *5*		2736.7	8$^+$	2599.9	7$^-$				
167.0 *5*		4091.1	11$^-$	3924.2	10$^-$				
167.4‡ *3*	14.1 *25*	4628.5	13$^-$	4461.1	12$^+$	[E1]	0.0681	15.4 *27*	ce(K)/(γ+ce)=0.0541 *8*; ce(L)/(γ+ce)=0.00759 *12*; ce(M)/(γ+ce)=0.001621 *24* ce(N)/(γ+ce)=0.000363 *6*; ce(O)/(γ+ce)=5.25×10^{-5} *8*; ce(P)/(γ+ce)=2.81×10^{-6} *5* α(K)=0.0578 *9*; α(L)=0.00810 *12*; α(M)=0.00173 *3* α(N)=0.000388 *6*; α(O)=5.60×10^{-5} *9*; α(P)=3.00×10^{-6} *5*
171.0 *5*		3924.2	10$^-$	3753.2	10$^+$				
173.0 *5*		4752.1	13$^+$	4579.5	12$^-$				
188.0 *5*		3354.0	9$^-$	3166.5	8$^-$				
197.3‡ *3*	22.2 *22*	2797.3	9$^-$	2599.9	7$^-$	E2	0.218	27.1 *27*	B(E2)↓=0.05 *1* (1982Ro05) ce(K)/(γ+ce)=0.1285 *17*; ce(L)/(γ+ce)=0.0395 *6*; ce(M)/(γ+ce)=0.00896 *14* ce(N)/(γ+ce)=0.00198 *3*; ce(O)/(γ+ce)=0.000263 *4*; ce(P)/(γ+ce)=6.35×10^{-6} *10* α(K)=0.1565 *24*; α(L)=0.0482 *8*; α(M)=0.01092 *17* α(N)=0.00241 *4*; α(O)=0.000320 *5*; α(P)=7.73×10^{-6} *12*
207.0 *5*		3774.5	10$^+$	3567.2	9$^+$				
217.0 *5*		4969.1	14	4752.1	13$^+$				
239.0 *5*		4579.5	12$^-$	4340.7	11$^-$				
248.5‡ *3*	≈6.6	5217.7	15$^-$	4969.1	14	[M1]	0.1338	≈7.5	ce(K)/(γ+ce)=0.1002 *13*; ce(L)/(γ+ce)=0.01396 *20*; ce(M)/(γ+ce)=0.00300 *5* ce(N)/(γ+ce)=0.000679 *10*; ce(O)/(γ+ce)=0.0001019 *15*; ce(P)/(γ+ce)=6.35×10^{-6} *10* α(K)=0.1136 *17*; α(L)=0.01583 *23*; α(M)=0.00340 *5* α(N)=0.000770 *11*; α(O)=0.0001156 *17*; α(P)=7.20×10^{-6} *11*
250.0 *5*		4340.7	11$^-$	4091.1	11$^-$				
257.0 *5*		5871.1		5614.1	(15)				
259.0 *5*		4033.3	11$^+$	3774.5	10$^+$				
290.8‡ *3*	≈6.9	4752.1	13$^+$	4461.1	12$^+$	[M1]	0.0878	≈7.5	ce(K)/(γ+ce)=0.0686 *10*; ce(L)/(γ+ce)=0.00952 *14*;

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

γ(^{146}Sm) (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult.&	α a	$I_{(\gamma+ce)}$ @	Comments
									ce(M)/(γ+ce)=0.00204 *3* ce(N)/(γ+ce)=0.000463 *7*; ce(O)/(γ+ce)=6.95×10^{-5} *10*; ce(P)/(γ+ce)=4.34×10^{-6} *7* α(K)=0.0747 *11*; α(L)=0.01035 *15*; α(M)=0.00222 *4* α(N)=0.000503 *8*; α(O)=7.56×10^{-5} *11*; α(P)=4.72×10^{-6} *7*
299.0 *5*		5516.9	16	5217.7	15$^-$				
308.0 *5*		4091.1	11$^-$	3783.1	11$^-$				
317.0 *5*		4461.1	12$^+$	4143.6	11$^-$				
340.7‡ *3*	19.9 *26*	4969.1	14	4628.5	13$^-$	[M1]	0.0578	21.1 *27*	ce(K)/(γ+ce)=0.0465 *7*; ce(L)/(γ+ce)=0.00642 *9*; ce(M)/(γ+ce)=0.001375 *20* ce(N)/(γ+ce)=0.000312 *5*; ce(O)/(γ+ce)=4.68×10^{-5} *7*; ce(P)/(γ+ce)=2.93×10^{-6} *5* α(K)=0.0492 *7*; α(L)=0.00679 *10*; α(M)=0.001454 *21* α(N)=0.000330 *5*; α(O)=4.95×10^{-5} *7*; α(P)=3.10×10^{-6} *5*
370.0 *5*		3166.5	8$^-$	2797.3	9$^-$				
370.2‡ *3*	17.1 *27*	4461.1	12$^+$	4091.1	11$^-$	[E1]	0.00873	17.2 *27*	ce(K)/(γ+ce)=0.00740 *11*; ce(L)/(γ+ce)=0.000994 *14*; ce(M)/(γ+ce)=0.000212 *3* ce(N)/(γ+ce)=4.78×10^{-5} *7*; ce(O)/(γ+ce)=7.05×10^{-6} *10*; ce(P)/(γ+ce)=4.13×10^{-7} *6* α(K)=0.00746 *11*; α(L)=0.001003 *15*; α(M)=0.000214 *3* α(N)=4.82×10^{-5} *7*; α(O)=7.11×10^{-6} *10*; α(P)=4.17×10^{-7} *6*
392.0 *5*		5144.1	(14)	4752.1	13$^+$				
401.0 *5*		3567.2	9$^+$	3166.5	8$^-$				
411.0‡ *3*	16.3 *26*	2222.1	6$^+$	1811.2	6$^+$	[M1]	0.0355	16.9 *27*	ce(K)/(γ+ce)=0.0292 *4*; ce(L)/(γ+ce)=0.00400 *6*; ce(M)/(γ+ce)=0.000857 *13* ce(N)/(γ+ce)=0.000194 *3*; ce(O)/(γ+ce)=2.92×10^{-5} *5*; ce(P)/(γ+ce)=1.84×10^{-6} *3* α(K)=0.0302 *5*; α(L)=0.00415 *6*; α(M)=0.000888 *13* α(N)=0.000201 *3*; α(O)=3.03×10^{-5} *5*; α(P)=1.90×10^{-6} *3*
411.9‡ *5*	16.2 *27*	4194.9	12$^+$	3783.1	11$^-$	E1	0.00676	16.3 *27*	ce(K)/(γ+ce)=0.00574 *9*; ce(L)/(γ+ce)=0.000768 *11*; ce(M)/(γ+ce)=0.0001636 *24* ce(N)/(γ+ce)=3.69×10^{-5} *6*; ce(O)/(γ+ce)=5.46×10^{-6} *8*; ce(P)/(γ+ce)=3.23×10^{-7} *5* α(K)=0.00578 *9*; α(L)=0.000773 *11*; α(M)=0.0001648 *24* α(N)=3.72×10^{-5} *6*; α(O)=5.49×10^{-6} *8*; α(P)=3.25×10^{-7} *5* Mult.: from 1998Bi11.

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

$\gamma(^{146}Sm)$ (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α a	$I_{(\gamma+ce)}$ @	Comments
428.0 *5*		4461.1	12^+	4033.3	11^+				
430.3‡ *3*	89.9 *26*	1811.2	6^+	1380.8	4^+	E2	0.0193	91.6 *27*	B(E2)↓=0.04 *+6−2* (1982Ro05) ce(K)/(γ+ce)=0.01539 *22*; ce(L)/(γ+ce)=0.00281 *4*; ce(M)/(γ+ce)=0.000617 *9* ce(N)/(γ+ce)=0.0001381 *20*; ce(O)/(γ+ce)=1.96×10^{-5} *3*; ce(P)/(γ+ce)=8.72×10^{-7} *13* α(K)=0.01568 *23*; α(L)=0.00286 *4*; α(M)=0.000629 *9* α(N)=0.0001407 *20*; α(O)=1.99×10^{-5} *3*; α(P)=8.88×10^{-7} *13*
433.0 *5*		4628.5	13^-	4194.9	12^+	(E1)	0.00601		α(K)=0.00514 *8*; α(L)=0.000686 *10*; α(M)=0.0001461 *21* α(N)=3.30×10^{-5} *5*; α(O)=4.88×10^{-6} *7*; α(P)=2.90×10^{-7} *5*
436.0 *5*		4579.5	12^-	4143.6	11^-				
466.0 *5*		4033.3	11^+	3567.2	9^+				
479.0 *5*		5696.7	16^+	5217.7	15^-				
480.0 *5*		6176.7	(18^+)	5696.7	16^+				
491.0 *5*		5696.7	16^+	5205.8	14^+				
516.8‡ *3*	≈7.4	2599.9	7^-	2083.2	5^-	E2	0.01175	≈7.5	B(E2)↓=0.013 *+10−5* (1982Ro05) ce(K)/(γ+ce)=0.00956 *14*; ce(L)/(γ+ce)=0.001614 *23*; ce(M)/(γ+ce)=0.000352 *5* ce(N)/(γ+ce)=7.91×10^{-5} *12*; ce(O)/(γ+ce)=1.135×10^{-5} *16*; ce(P)/(γ+ce)=5.51×10^{-7} *8* α(K)=0.00967 *14*; α(L)=0.001633 *23*; α(M)=0.000357 *5* α(N)=8.00×10^{-5} *12*; α(O)=1.148×10^{-5} *17*; α(P)=5.58×10^{-7} *8*
524.0 *5*		3567.2	9^+	3042.7	8^+				
537.5‡ *3*	12.9 *27*	4628.5	13^-	4091.1	11^-	[E2]	0.01060	13.0 *27*	ce(K)/(γ+ce)=0.00866 *12*; ce(L)/(γ+ce)=0.001440 *21*; ce(M)/(γ+ce)=0.000314 *5* ce(N)/(γ+ce)=7.05×10^{-5} *10*; ce(O)/(γ+ce)=1.015×10^{-5} *15*; ce(P)/(γ+ce)=5.01×10^{-7} *7* α(K)=0.00875 *13*; α(L)=0.001456 *21*; α(M)=0.000317 *5* α(N)=7.13×10^{-5} *10*; α(O)=1.026×10^{-5} *15*; α(P)=5.06×10^{-7} *8*
548.0 *5*		5516.9	16	4969.1	14				
556.9‡ *3*	18.7 *27*	3354.0	9^-	2797.3	9^-	[M1]	0.01641	19.0 *27*	ce(K)/(γ+ce)=0.01377 *20*; ce(L)/(γ+ce)=0.00187 *3*; ce(M)/(γ+ce)=0.000400 *6* ce(N)/(γ+ce)=9.06×10^{-5} *13*; ce(O)/(γ+ce)=1.363×10^{-5} *20*; ce(P)/(γ+ce)=8.61×10^{-7} *13* α(K)=0.01400 *20*; α(L)=0.00190 *3*; α(M)=0.000406 *6* α(N)=9.21×10^{-5} *13*; α(O)=1.386×10^{-5} *20*; α(P)=8.75×10^{-7} *13*

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

γ(^{146}Sm) (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α a	$I_{(\gamma+ce)}$ @	Comments
566.0 *5*		4340.7	11^-	3774.5	10^+				
566.6‡ *3*	≈7.4	3166.5	8^-	2599.9	7^-	M1	0.01571	≈7.5	ce(K)/(γ+ce)=0.01320 *19*; ce(L)/(γ+ce)=0.00179 *3*; ce(M)/(γ+ce)=0.000383 *6* ce(N)/(γ+ce)=8.68×10^{-5} *13*; ce(O)/(γ+ce)=1.306×10^{-5} *19*; ce(P)/(γ+ce)=8.25×10^{-7} *12* α(K)=0.01341 *19*; α(L)=0.00182 *3*; α(M)=0.000389 *6* α(N)=8.82×10^{-5} *13*; α(O)=1.326×10^{-5} *19*; α(P)=8.38×10^{-7} *12*
570.0 *5*		3924.2	10^-	3354.0	9^-				
589.0 *5*		5217.7	15^-	4628.5	13^-				
618.0 *5*		3354.0	9^-	2736.7	8^+				
633.0‡ *3*	≈7.5	1380.7	3^-	747.2	2^+	[E1]	0.00257	≈7.5	ce(K)/(γ+ce)=0.00220 *3*; ce(L)/(γ+ce)=0.000288 *4*; ce(M)/(γ+ce)=6.13×10^{-5} *9* ce(N)/(γ+ce)=1.385×10^{-5} *20*; ce(O)/(γ+ce)=2.06×10^{-6} *3*; ce(P)/(γ+ce)=1.259×10^{-7} *18* α(K)=0.00220 *3*; α(L)=0.000289 *4*; α(M)=6.15×10^{-5} *9* α(N)=1.389×10^{-5} *20*; α(O)=2.07×10^{-6} *3*; α(P)=1.262×10^{-7} *18*
634.1‡ *3*	94.4 *27*	1380.8	4^+	747.2	2^+	E2	0.00699	96.1 *27*	B(E2)↓≤0.061 (1982Ro05) ce(K)/(γ+ce)=0.00578 *8*; ce(L)/(γ+ce)=0.000910 *13*; ce(M)/(γ+ce)=0.000197 *3* ce(N)/(γ+ce)=4.44×10^{-5} *7*; ce(O)/(γ+ce)=6.45×10^{-6} *9*; ce(P)/(γ+ce)=3.38×10^{-7} *5* α(K)=0.00582 *9*; α(L)=0.000916 *13*; α(M)=0.000199 *3* α(N)=4.47×10^{-5} *7*; α(O)=6.50×10^{-6} *10*; α(P)=3.41×10^{-7} *5*
645.0 *5*		5614.1	(15)	4969.1	14				
656.0 *5*		5800.1		5144.1	(14)				
702.0‡ *3*	≈7.5	2083.2	5^-	1380.8	4^+	E1	0.00207	≈7.5	ce(K)/(γ+ce)=0.001772 *25*; ce(L)/(γ+ce)=0.000231 *4*; ce(M)/(γ+ce)=4.92×10^{-5} *7* ce(N)/(γ+ce)=1.111×10^{-5} *16*; ce(O)/(γ+ce)=1.657×10^{-6} *24*; ce(P)/(γ+ce)=1.018×10^{-7} *15* α(K)=0.001776 *25*; α(L)=0.000232 *4*; α(M)=4.93×10^{-5} *7* α(N)=1.114×10^{-5} *16*; α(O)=1.661×10^{-6} *24*; α(P)=1.020×10^{-7} *15*
703.0‡ *3*	≈7.5	2083.2	5^-	1380.7	3^-	E2	0.00545	≈7.5	ce(K)/(γ+ce)=0.00454 *7*; ce(L)/(γ+ce)=0.000693 *10*; ce(M)/(γ+ce)=0.0001500 *21* ce(N)/(γ+ce)=3.38×10^{-5} *5*; ce(O)/(γ+ce)=4.93×10^{-6} *7*; ce(P)/(γ+ce)=2.67×10^{-7} *4*

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

$\gamma(^{146}Sm)$ (continued)

E_γ †	I_γ #	E_i(level)	J_i^π	E_f	J_f^π	Mult. &	α a	$I_{(\gamma+ce)}$ @	Comments
									α(K)=0.00457 *7*; α(L)=0.000697 *10*; α(M)=0.0001508 *22* α(N)=3.40×10^{-5} *5*; α(O)=4.96×10^{-6} *7*; α(P)=2.69×10^{-7} *4*
732.0 *5*		3774.5	10$^+$	3042.7	8$^+$				
737.7‡ *3*	15.5 *27*	4091.1	11$^-$	3354.0	9$^-$	[E2]	0.00487	15.6 *27*	ce(K)/(γ+ce)=0.00407 *6*; ce(L)/(γ+ce)=0.000613 *9*; ce(M)/(γ+ce)=0.0001325 *19* ce(N)/(γ+ce)=2.99×10^{-5} *5*; ce(O)/(γ+ce)=4.37×10^{-6} *7*; ce(P)/(γ+ce)=2.40×10^{-7} *4* α(K)=0.00409 *6*; α(L)=0.000616 *9*; α(M)=0.0001331 *19* α(N)=3.00×10^{-5} *5*; α(O)=4.39×10^{-6} *7*; α(P)=2.41×10^{-7} *4*
747.2‡ *3*	99.5 *27*	747.2	2$^+$	0	0$^+$	E2	0.00473	100.0 *27*	ce(K)/(γ+ce)=0.00395 *6*; ce(L)/(γ+ce)=0.000593 *9*; ce(M)/(γ+ce)=0.0001282 *18* ce(N)/(γ+ce)=2.89×10^{-5} *4*; ce(O)/(γ+ce)=4.23×10^{-6} *6*; ce(P)/(γ+ce)=2.33×10^{-7} *4* α(K)=0.00397 *6*; α(L)=0.000596 *9*; α(M)=0.0001288 *18* α(N)=2.90×10^{-5} *4*; α(O)=4.25×10^{-6} *6*; α(P)=2.34×10^{-7} *4* B(E2)=0.048 +∞−*1* (1982Ro05).
754.0 *5*		3354.0	9$^-$	2599.9	7$^-$				
758.0 *5*		3924.2	10$^-$	3166.5	8$^-$				
788.8‡ *5*	34.8 *27*	2599.9	7$^-$	1811.2	6$^+$	[E1]	1.63×10^{-3}	34.9 *27*	ce(K)/(γ+ce)=0.001400 *20*; ce(L)/(γ+ce)=0.000182 *3*; ce(M)/(γ+ce)=3.86×10^{-5} *6* ce(N)/(γ+ce)=8.73×10^{-6} *13*; ce(O)/(γ+ce)=1.304×10^{-6} *19*; ce(P)/(γ+ce)=8.07×10^{-8} *12* α(K)=0.001402 *20*; α(L)=0.000182 *3*; α(M)=3.87×10^{-5} *6* α(N)=8.75×10^{-6} *13*; α(O)=1.306×10^{-6} *19*; α(P)=8.08×10^{-8} *12*
820.7‡ *3*	12.3 *27*	3042.7	8$^+$	2222.1	6$^+$	[E2]	0.00382	12.3 *27*	ce(K)/(γ+ce)=0.00321 *5*; ce(L)/(γ+ce)=0.000471 *7*; ce(M)/(γ+ce)=0.0001015 *15* ce(N)/(γ+ce)=2.29×10^{-5} *4*; ce(O)/(γ+ce)=3.37×10^{-6} *5*; ce(P)/(γ+ce)=1.90×10^{-7} *3* α(K)=0.00322 *5*; α(L)=0.000472 *7*; α(M)=0.0001019 *15* α(N)=2.30×10^{-5} *4*; α(O)=3.38×10^{-6} *5*; α(P)=1.91×10^{-7} *3*

Continued on next page (footnotes at end of table)

^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

$\gamma(^{146}Sm)$ (continued)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[a]	$I_{(\gamma+ce)}$[@]	Comments
925.5[‡] *3*	55.8 *27*	2736.7	8^+	1811.2	6^+	E2	0.00293	56.0 *27*	B(E2)↓=0.0073 *+4−2* (1982Ro05) ce(K)/(γ+ce)=0.00247 *4*; ce(L)/(γ+ce)=0.000354 *5*; ce(M)/(γ+ce)=7.61×10^{-5} *11* ce(N)/(γ+ce)=1.718×10^{-5} *24*; ce(O)/(γ+ce)=2.54×10^{-6} *4*; ce(P)/(γ+ce)=1.469×10^{-7} *21* α(K)=0.00248 *4*; α(L)=0.000355 *5*; α(M)=7.63×10^{-5} *11* α(N)=1.723×10^{-5} *25*; α(O)=2.55×10^{-6} *4*; α(P)=1.473×10^{-7} *21*
956.0 *5*		3753.2	10^+	2797.3	9^-				
969.0 *5*		4752.1	13^+	3783.1	11^-				
985.9[‡] *3*	21.7 *27*	3783.1	11^-	2797.3	9^-	E2	0.00256	21.7 *27*	B(E2)↓=0.006 *+3−2* (1982Ro05) ce(K)/(γ+ce)=0.00217 *3*; ce(L)/(γ+ce)=0.000306 *5*; ce(M)/(γ+ce)=6.58×10^{-5} *10* ce(N)/(γ+ce)=1.485×10^{-5} *21*; ce(O)/(γ+ce)=2.20×10^{-6} *3*; ce(P)/(γ+ce)=1.287×10^{-7} *18* α(K)=0.00217 *3*; α(L)=0.000307 *5*; α(M)=6.59×10^{-5} *10* α(N)=1.489×10^{-5} *21*; α(O)=2.21×10^{-6} *3*; α(P)=1.290×10^{-7} *18*
986.0 *5*	1.64 *17*	2797.3	9^-	1811.2	6^+	E3	0.00550	1.65 *27*	ce(K)/(γ+ce)=0.00452 *7*; ce(L)/(γ+ce)=0.000748 *11*; ce(M)/(γ+ce)=0.0001634 *23* ce(N)/(γ+ce)=3.68×10^{-5} *6*; ce(O)/(γ+ce)=5.37×10^{-6} *8*; ce(P)/(γ+ce)=2.81×10^{-7} *4* α(K)=0.00454 *7*; α(L)=0.000752 *11*; α(M)=0.0001643 *24* α(N)=3.70×10^{-5} *6*; α(O)=5.40×10^{-6} *8*; α(P)=2.83×10^{-7} *4* $I_{(\gamma+ce)}$: calculated by evaluators from γ branching ratio=0.03, mult=E3 (1995Ba57) and I(γ+ce) of 60.5 and 197.3 γ's.
1011.0 *5*		5205.8	14^+	4194.9	12^+				
1231.0 *5*		3042.7	8^+	1811.2	6^+				
1293.6[‡] *3*	13.6 *27*	4091.1	11^-	2797.3	9^-	[E2]	1.49×10^{-3}	13.6 *27*	ce(K)/(γ+ce)=0.001252 *18*; ce(L)/(γ+ce)=0.0001698 *24*; ce(M)/(γ+ce)=3.63×10^{-5} *5* ce(N)/(γ+ce)=8.21×10^{-6} *12*;

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^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05 (continued)

γ(^{146}Sm) (continued)

E_γ [†]	I_γ [#]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [&]	α [a]	$I_{(\gamma+ce)}$ [@]	Comments
									ce(O)/(γ+ce)=1.225×10^{-6} *18*; ce(P)/(γ+ce)=7.46×10^{-8} *11*; α(IPF)/$T_{1/2}$=1.93×10^{-5} *3* α(K)=0.001254 *18*; α(L)=0.0001701 *24*; α(M)=3.64×10^{-5} *5* α(N)=8.23×10^{-6} *12*; α(O)=1.227×10^{-6} *18*; α(P)=7.47×10^{-8} *11*; α(IPF)=1.93×10^{-5} *3*
1346.0 *5*		4143.6	11$^-$	2797.3	9$^-$				
1397.0 *5*	0.11 *2*	4194.9	12$^+$	2797.3	9$^-$	E3	0.00247	0.11 *2*	ce(K)/(γ+ce)=0.00206 *3*; ce(L)/(γ+ce)=0.000304 *5*; ce(M)/(γ+ce)=6.57×10^{-5} *10* ce(N)/(γ+ce)=1.485×10^{-5} *21*; ce(O)/(γ+ce)=2.20×10^{-6} *3*; ce(P)/(γ+ce)=1.274×10^{-7} *18*; α(IPF)/$T_{1/2}$=1.606×10^{-5} *24* α(K)=0.00207 *3*; α(L)=0.000305 *5*; α(M)=6.58×10^{-5} *10* α(N)=1.488×10^{-5} *21*; α(O)=2.20×10^{-6} *3*; α(P)=1.277×10^{-7} *18*; α(IPF)=1.610×10^{-5} *24* Mult.: from 1998Bi11. $I_{(\gamma+ce)}$,I_γ: calculated by evaluators from I(γ+ce) branching ratio ≈0.007 (1998Bi11).
1408.0 *5*		4144.7		2736.7	8$^+$				
1543.0 *5*		4340.7	11$^-$	2797.3	9$^-$				

[†] From 1995Ba07, except as noted; $\Delta E\gamma$=0.5 is assumed by evaluators.
[‡] From 1982Ro05; $\Delta E\gamma$=0.3 is assumed by evaluators.
[#] Calculated by evaluators from I(γ+ce) and corresponding α.
[@] Taken from the fig. 1 of 1982Ro05 and normalized to 100 for 747.2 keV transition by evaluators according to statement of authors that 'the widths of the arrows are approximately proportional to measured intensities', if otherwise not specified.
[&] From $\gamma(\theta)$ (1995Ba07,1999BiZX), $T_{1/2}$ (1982Ro05,1998Bi19) as well as with $\gamma(\theta)$, I(ce) data from 1978Ki11, 1980Ko07, 1975Si03.
[a] Additional information 1.

^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05

Level Scheme

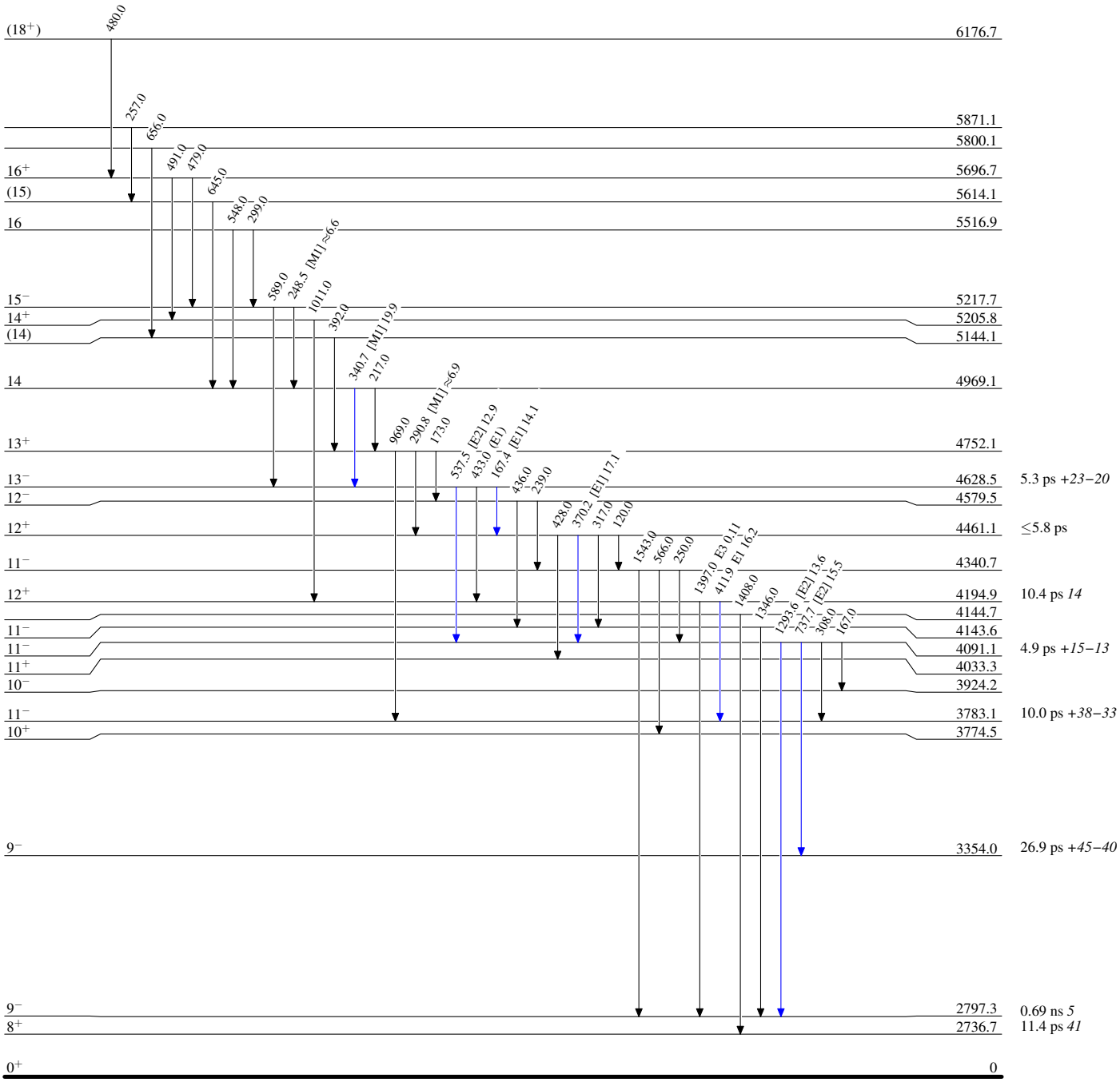
Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$



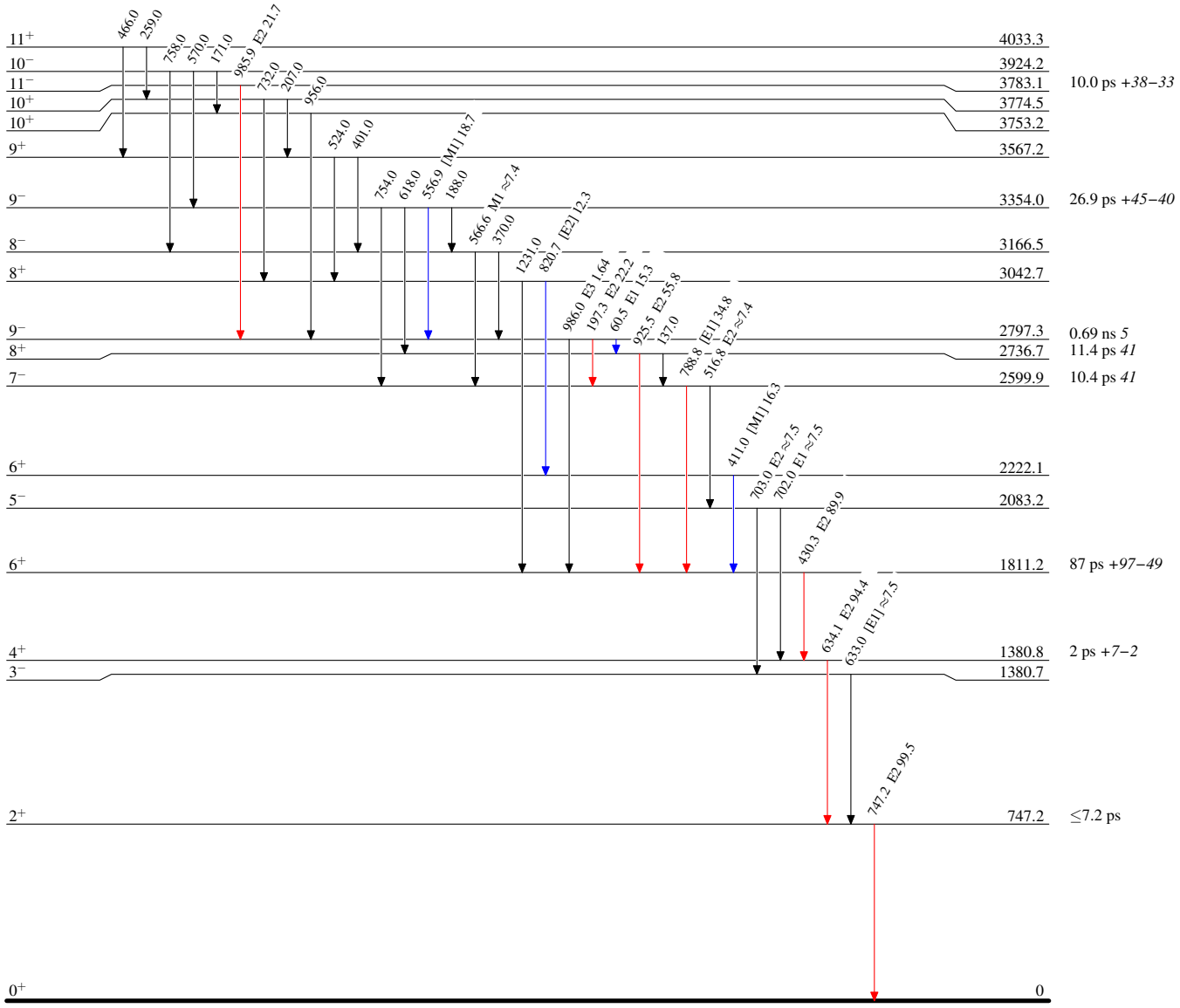
$^{146}_{62}Sm_{84}$

^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05

Level Scheme (continued)

Intensities: Relative I_γ

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{146}_{62}Sm_{84}$

^{139}La(^{11}B,4nγ) 1995Ba07,1982Ro05