^{149}Sm(^{32}S,4nγ) 1990Dr03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 159, 1 (2019)	30-Aug-2019

Produced using the ^{149}Sm(^{32}S,4nγ) reaction. Projectile: ^{32}S, E=163 MeV. Target: ^{149}Sm, 2.8 mg/cm^2 thick (γγ(t)) and 3.2 mg/cm^2 thick (γ(θ)), 96.6 % enriched. Measured Eγ, Iγ, γγ coin, γγ(t), γ(θ). Detectors: γγ(t) experiment-two Compton suppressed Ge detectors and a small volume Ge detector (LEPS). Coincidences in the time window of ± 500 ns were recorded for all combinations of the three detectors; γ(θ) experiment-four Ge detectors (0°, 33°, 57°, 90°) in coincidence with an array of NaI(Tl) detectors placed upstream from the target in a halo around the beam axis.

^{177}Pt Levels

E(level)[†]	J^{π}[‡]	$T_{1/2}$[#]	Comments
0.0[a]	5/2−	10.0 s *4*	
81.2[a] *4*	7/2−		
94.8[b] *5*	7/2+	8.3[@] ns *7*	
140.4[b] *7*	9/2+		
147.5[&] *4*	1/2−	2.2 μs *3*	
197.4[a] *4*	9/2−		
209.8[b] *7*	11/2+		
214.0 *10*	(3/2−)		E(level),configuration: Probably a member of the K^{π}=1/2−, ν1/2[521] band.
239.9[&] *4*	5/2−		
264.7[b] *7*	13/2+		
336.3[a] *5*	11/2−		
430.4[&] *6*	9/2−		
441.0[b] *8*	15/2+		
491.8[a] *5*	13/2−		
531.9[b] *8*	17/2+		
666.7[a] *6*	15/2−		
697.8[&] *8*	13/2−		
778.0[b] *8*	19/2+		
855.5[a] *6*	17/2−		
902.0[b] *9*	21/2+		
1031.9[&] *10*	17/2−		
1060.2[a] *7*	19/2−		
1199.8[b] *9*	23/2+		
1277.5[a] *7*	21/2−		
1348.2[b] *9*	25/2+		
1424.8[&] *11*	21/2−		
1508.9[a] *7*	23/2−		
1696.0[b] *9*	27/2+		
1750.3[a] *8*	25/2−		
1863.0[b] *10*	29/2+		
1869.3[&] *12*	25/2−		
2005.8[a] *9*	27/2−		
2259.0[b] *11*	31/2+		
2267.8[a] *9*	29/2−		
2359.0[&] *13*	29/2−		
2441.9[b] *11*	33/2+		
2544.7[a] *10*	31/2−		

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^{149}Sm(^{32}S,4nγ) 1990Dr03 (continued)

^{177}Pt Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
2824.6[a] *11*	33/2⁻	3117.4[a] *11*	35/2⁻	3721.0[a] *12*	(39/2⁻)	4353.0[a] *13*	(43/2⁻)
2883.9[b] *12*	35/2⁺	3416.4[a] *12*	(37/2⁻)	3777.5[b] *13*	(41/2⁺)	4524.5[b] *14*	(45/2⁺)
2889.0[&] *14*	33/2⁻	3458.9[&] *15*	37/2⁻	4034.7[a] *13*	(41/2⁻)	4683.7[a] *14*	(45/2⁻)
3081.5[b] *12*	37/2⁺	3566.8[b] *13*	(39/2⁺)	4065.9[&] *16*	(41/2⁻)		

† From a least-squares fit to Eγ, unless otherwise stated.
‡ From 1990Dr03, based on deduced γ-ray transition multipolarities and the observed band structures.
# From Adopted Levels, unless otherwise stated.
@ From γγ(t) spectrum produced by gating on the 94.8 keV γ-ray transition (below the isomer) and several in-band γ-ray transitions (above the isomer) (1990Dr03).
& Band(A): K^π=1/2⁻, ν1/2[521] band. The assignment is supported by the observed in-band properties, such as large signature splitting and rotational alignment. The assignment is consistent with systematics of known similar structures in neighboring odd mass nuclei.
a Band(B): K^π=5/2⁻, ν5/2[512] band. The assignment is supported by the observed in-band properties, such as alignment, g_K-g_R values, and systematics of similar structures in neighboring odd-mass nuclei.
b Band(C): K^π=7/2⁺, ν7/2[633] Coriolis-mixed ($i_{13/2}$) band. The assignment is supported by the observed in-band properties, such as large apparent alignment, delayed first band crossing, g_K-g_R values, and systematics of similar structures in neighboring odd mass nuclei.

γ(^{177}Pt)

Mixing ratios values are deduced from the branching ratios and the rotational model, and by assuming pure K, unless otherwise specified.

Eγ‡	Iγ#	E_i(level)	J_i^π	E_f	J_f^π	Mult.@	Comments
45.7 *5*	≈13[&]	140.4	9/2⁺	94.8	7/2⁺	M1(+E2)[b]	
55.2 *5*	20[&] *7*	264.7	13/2⁺	209.8	11/2⁺	M1(+E2)[b]	δ: δ= 0.22 *5* by assuming K=7/2.
69.9 *5*	42[&] *2*	209.8	11/2⁺	140.4	9/2⁺	M1(+E2)[b]	δ: δ= 0.34 *2* by assuming K=7/2.
81.2 *5*	15[&] *2*	81.2	7/2⁻	0.0	5/2⁻	M1(+E2)[b]	
90.9 *5*	9[&] *1*	531.9	17/2⁺	441.0	15/2⁺	[M1+E2]	δ: δ= 0.28 *2* by assuming K=7/2.
92.4† *5*		239.9	5/2⁻	147.5	1/2⁻	[E2]	
94.8 *5*	259 *6*	94.8	7/2⁺	0.0	5/2⁻	E1[b]	Mult.: A_2=− 0.20 *5*, A_4=− 0.05 *7*.
114.9 *5*	11[&] *1*	209.8	11/2⁺	94.8	7/2⁺	E2[b]	
116.1 *5*	70[&] *7*	197.4	9/2⁻	81.2	7/2⁻	[M1+E2]	δ: δ= 0.37 *4* by assuming K=5/2.
124.1 *5*	24[&] *7*	264.7	13/2⁺	140.4	9/2⁺	[E2]	
124.1 *5*	17[&] *2*	902.0	21/2⁺	778.0	19/2⁺	[M1+E2]	δ: δ= 0.18 *2* by assuming K=7/2.
138.7 *5*	65 *3*	336.3	11/2⁻	197.4	9/2⁻	M1+E2	Mult.: A_2=− 0.58 *8*, A_4= 0.01 *9*. δ: δ= 0.34 *2* by assuming K=5/2. Other: δ=− 0.35 *+14−25* from γ(θ).
147.4† *5*		147.5	1/2⁻	0.0	5/2⁻	[E2]	
148.4 *5*	11[&] *2*	1348.2	25/2⁺	1199.8	23/2⁺	[M1+E2]	δ: δ= 0.17 *1* by assuming K=7/2.
155.6 *5*	45 *3*	491.8	13/2⁻	336.3	11/2⁻	M1+E2	Mult.: A_2=− 0.34 *10*, A_4= 0.30 *14*. δ: δ= 0.27 *1* by assuming K=5/2.
158.7 *5*		239.9	5/2⁻	81.2	7/2⁻	[M1+E2]	

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^{149}Sm(^{32}S,4nγ) 1990Dr03 (continued)

γ(^{177}Pt) (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	Comments
167.4 5	6[&] 2	1863.0	29/2+	1696.0	27/2+	(M1+E2)	Mult.: A_2=− 0.18 25. δ: δ= 0.20 3 by assuming K=7/2.
175.0 5	26[&] 4	666.7	15/2−	491.8	13/2−	(M1+E2)	Mult.: A_2=− 0.06 20. δ: δ= 0.26 3 by assuming K=5/2.
176.2 5	90[&] 10	441.0	15/2+	264.7	13/2+	(M1+E2)	Mult.: A_2=− 0.54 11. δ: δ= 0.79 7 by assuming K=7/2.
188.7 5	43 5	855.5	17/2−	666.7	15/2−	(M1+E2)	Mult.: A_2=− 0.46 15. δ: δ= 0.23 1 by assuming K=5/2.
190.5 5	169 7	430.4	9/2−	239.9	5/2−	[E2]	
197.4 5	40[&] 8	197.4	9/2−	0.0	5/2−	[E2]	
204.7 5	28 2	1060.2	19/2−	855.5	17/2−	(M1+E2)	Mult.: A_2=− 0.30 11. δ: δ= 0.22 2 by assuming K=5/2.
214.0 10		214.0	(3/2−)	0.0	5/2−	[M1]	
217.4 5	30 3	1277.5	21/2−	1060.2	19/2−	(M1+E2)	Mult.: A_2=− 0.53 13. δ: δ= 0.20 1 by assuming K=5/2. Other: δ=− 0.25 +19−38 from γ(θ).
231.1 5	100 5	441.0	15/2+	209.8	11/2+	[E2]	
231.2 5	23 3	1508.9	23/2−	1277.5	21/2−	[M1+E2]	δ: δ= 0.20 1 by assuming K=5/2.
240.0 5		239.9	5/2−	0.0	5/2−	[M1+E2]	
241.0 5	21[&] 2	1750.3	25/2−	1508.9	23/2−	[M1+E2]	δ: δ= 0.21 2 by assuming K=5/2.
246.0 5	50[&] 3	778.0	19/2+	531.9	17/2+	M1+E2	Mult.: A_2=− 0.70 8, A_4=− 0.07 9. δ: δ= 0.70 7 by assuming K=7/2.
255 1	<30[a]	2005.8	27/2−	1750.3	25/2−	[M1+E2]	δ: δ=0.17 1 by assuming K=5/2.
255.1 5	102 10	336.3	11/2−	81.2	7/2−	[E2]	
260.2[c] 10	23[&] 3	2267.8	29/2−	2005.8	27/2−	[M1+E2]	δ: δ=0.16 1 by assuming K=5/2.
267.3 5	155 15	531.9	17/2+	264.7	13/2+	[E2]	
267.4 5	98 15	697.8	13/2−	430.4	9/2−	[E2]	
278.0[c] 10	20[&] 4	2544.7	31/2−	2267.8	29/2−	[M1+E2]	δ: δ=0.13 1 by assuming K=5/2.
281.0[c] 10	19 2	2824.6	33/2−	2544.7	31/2−	[M1+E2]	δ: δ=0.14 1 by assuming K=5/2.
292.0[c] 10	15 3	3117.4	35/2−	2824.6	33/2−	[M1+E2]	δ: δ=0.10 1 by assuming K=5/2.
294.5 5	86 4	491.8	13/2−	197.4	9/2−	E2	Mult.: A_2= 0.27 8, A_4=− 0.15 9.
298.0 5	41[&] 3	1199.8	23/2+	902.0	21/2+	(M1+E2)	Mult.: A_2=− 0.37 11. δ: δ= 0.59 4 by assuming K=7/2.
300.0[c] 10	14[&] 5	3416.4	(37/2−)	3117.4	35/2−	[M1+E2]	δ: δ=0.09 2 by assuming K=5/2.
330.3 5	68 9	666.7	15/2−	336.3	11/2−	E2	Mult.: A_2= 0.23 9, A_4=− 0.10 10.
334.1 5	171 5	1031.9	17/2−	697.8	13/2−	(E2)	Mult.: A_2= 0.14 4, A_4= 0.18 6.
337.0 5	114 12	778.0	19/2+	441.0	15/2+	(E2)	Mult.: A_2= 0.46 19, A_4=− 0.22 23.
348.1 5	20[&] 4	1696.0	27/2+	1348.2	25/2+	(M1+E2)	Mult.: A_2= 0.17 3, A_4=− 0.02 4. δ: δ= 0.66 9 by assuming K=7/2.
363.7 5	136 5	855.5	17/2−	491.8	13/2−	E2	Mult.: A_2= 0.31 7, A_4=− 0.01 7.
370.2 5	226 3	902.0	21/2+	531.9	17/2+	E2	Mult.: A_2= 0.30 3, A_4=− 0.06 4.
392.9 5	140 20	1424.8	21/2−	1031.9	17/2−	(E2)	Mult.: A_2= 0.3 3.
393.6 5	105 15	1060.2	19/2−	666.7	15/2−	(E2)	Mult.: A_2= 0.17 9.
396.2[c] 10	26[&] 5	2259.0	31/2+	1863.0	29/2+	[M1+E2]	δ: δ= 0.43 4 by assuming K=7/2.
421.6 5	135 8	1199.8	23/2+	778.0	19/2+	[E2]	
422.0 5	127 10	1277.5	21/2−	855.5	17/2−	[E2]	
444.5 5	70 15	1869.3	25/2−	1424.8	21/2−	[E2]	
446.2 5	213 12	1348.2	25/2+	902.0	21/2+	[E2]	
448.6 5	117 4	1508.9	23/2−	1060.2	19/2−	(E2)	Mult.: A_2= 0.34 5, A_4=− 0.08 6.
473.0 5	146 15	1750.3	25/2−	1277.5	21/2−	(E2)	Mult.: A_2= 0.18 5, A_4=− 0.24 5.
489.7 5	77 4	2359.0	29/2−	1869.3	25/2−	(E2)	Mult.: A_2= 0.29 10, A_4=− 0.03 10.
496.1 5	118[&] 9	1696.0	27/2+	1199.8	23/2+	[E2]	

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$^{149}Sm(^{32}S,4n\gamma)$ 1990Dr03 (continued)

$\gamma(^{177}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[@]	Comments
497.1 *5*	157 *11*	2005.8	27/2⁻	1508.9	23/2⁻	(E2)	Mult.: A_2= 0.45 *12*, A_4=− 0.14 *15*.
514.5 *5*	245 *10*	1863.0	29/2⁺	1348.2	25/2⁺	E2	Mult.: A_2= 0.19 *6*, A_4= 0.06 *6*.
517.5 *5*	137 *5*	2267.8	29/2⁻	1750.3	25/2⁻	(E2)	Mult.: A_2= 0.12 *10*.
530.0 *5*	62 *5*	2889.0	33/2⁻	2359.0	29/2⁻	(E2)	Mult.: A_2= 0.21 *18*.
538.9 *5*	88[&] *5*	2544.7	31/2⁻	2005.8	27/2⁻	(E2)	Mult.: A_2= 0.17 *5*, A_4=− 0.27 *8*.
556.8 *5*	116 *4*	2824.6	33/2⁻	2267.8	29/2⁻	(E2)	Mult.: A_2= 0.38 *7*, A_4=− 0.06 *7*.
563.0 *5*	106 *4*	2259.0	31/2⁺	1696.0	27/2⁺	E2	Mult.: A_2= 0.25 *7*, A_4=− 0.30 *8*.
569.9 *5*	43 *5*	3458.9	37/2⁻	2889.0	33/2⁻	(E2)	Mult.: A_2= 0.16 *16*.
572.7 *5*	45 *5*	3117.4	35/2⁻	2544.7	31/2⁻	[E2]	
578.9 *5*	93 *14*	2441.9	33/2⁺	1863.0	29/2⁺	[E2]	
591.8 *5*	40[&] *5*	3416.4	(37/2⁻)	2824.6	33/2⁻	[E2]	
603.6 *5*	38[&] *6*	3721.0	(39/2⁻)	3117.4	35/2⁻	[E2]	
607.0 *5*	22 *3*	4065.9	(41/2⁻)	3458.9	37/2⁻	[E2]	
618.3 *5*	31[&] *5*	4034.7	(41/2⁻)	3416.4	(37/2⁻)	[E2]	
624.9 *5*	56[&] *6*	2883.9	35/2⁺	2259.0	31/2⁺	[E2]	
632.0 *5*	16[&] *4*	4353.0	(43/2⁻)	3721.0	(39/2⁻)	[E2]	
639.6 *5*	64[&] *7*	3081.5	37/2⁺	2441.9	33/2⁺	[E2]	
649.0 *5*	17 *4*	4683.7	(45/2⁻)	4034.7	(41/2⁻)	[E2]	
682.9 *5*	20[&] *3*	3566.8	(39/2⁺)	2883.9	35/2⁺	[E2]	
696.0 *5*	32 *6*	3777.5	(41/2⁺)	3081.5	37/2⁺	[E2]	
747.0 *5*	≈15	4524.5	(45/2⁺)	3777.5	(41/2⁺)	[E2]	

[†] From adopted gammas.
[‡] From 1990Dr03, but uncertainties were assigned by the evaluator.
[#] From singles spectra unless otherwise stated.
[@] Determined from the measured angular distributions and total electron-conversion coefficients, deduced from intensity balance consideration for transitions with energies below 200 keV. For band structures that have both cascade (ΔJ=1) and crossover (ΔJ=2) transitions, ΔJ=M1 or M1+E2 and ΔJ=E2 are assumed.
[&] From $\gamma\gamma$ coincidence spectrum after appropriate normalization (1990Dr03).
[a] Deduced from the cascade to crossover branching ratio after appropriate normalization.
[b] From α(exp), using intensity balance considerations from $\gamma\gamma$ coincidence spectrum produced by gating above the level of interest.
[c] Placement of transition in the level scheme is uncertain.

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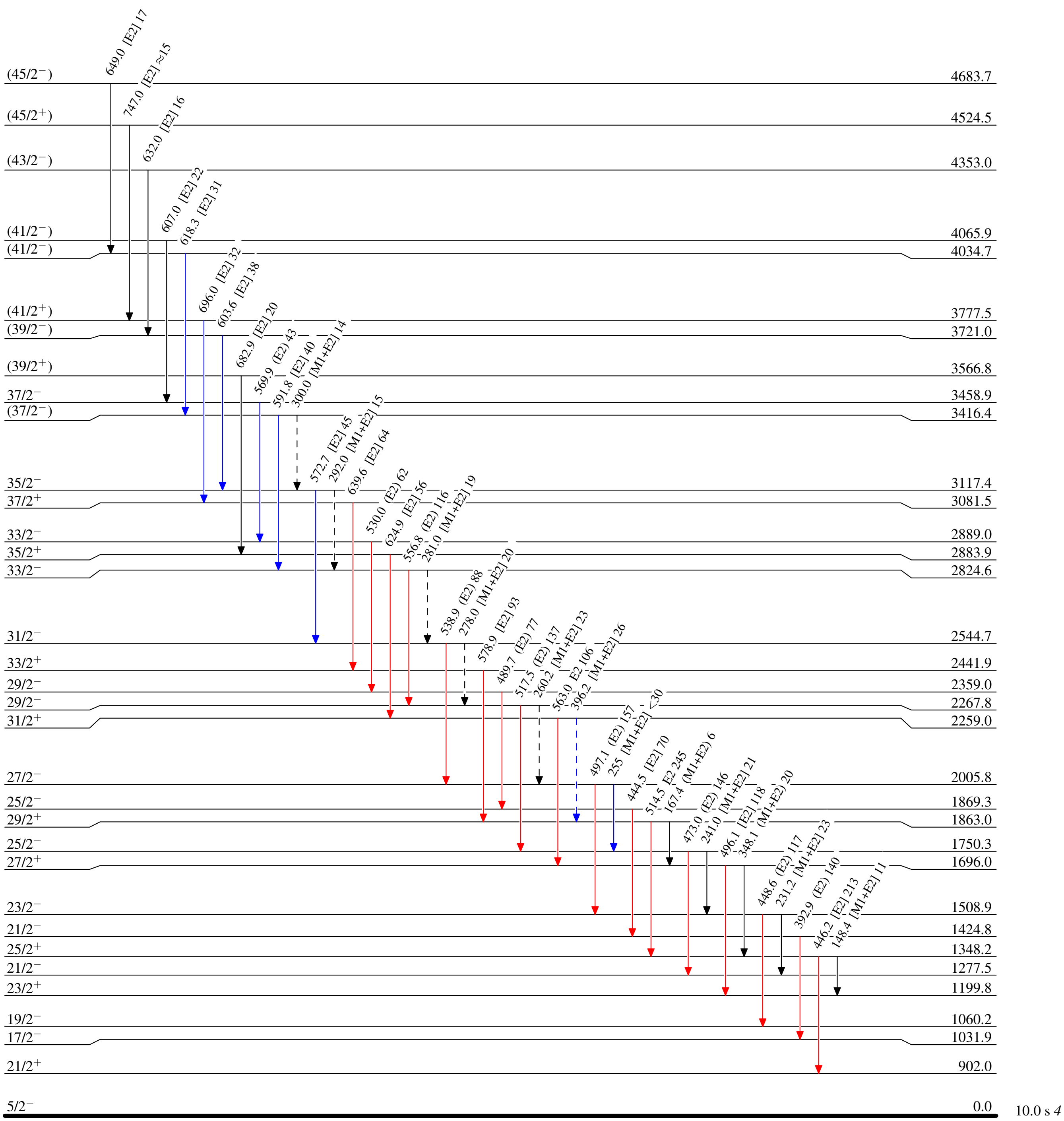
Level Scheme

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)

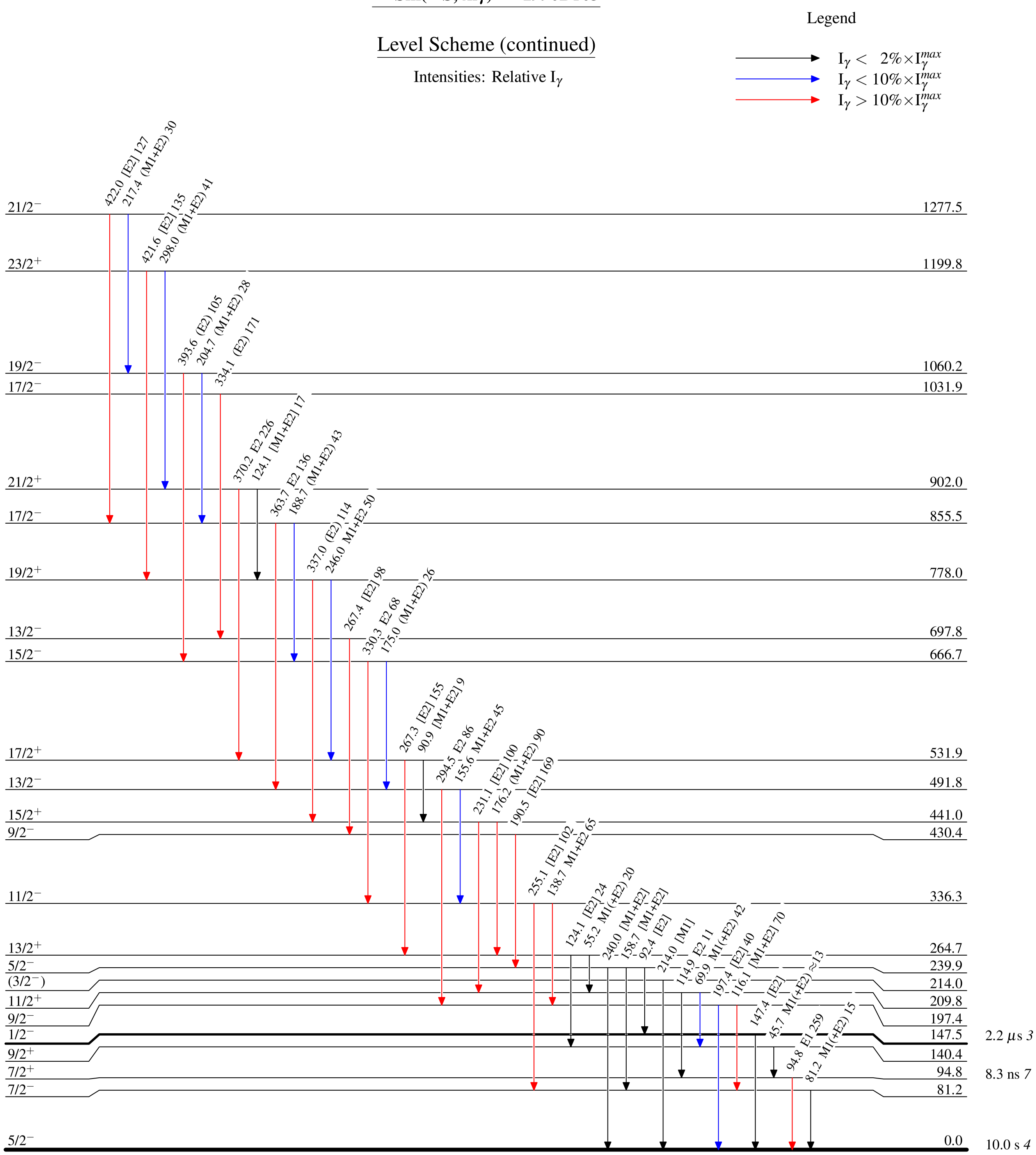


$^{177}_{78}Pt_{99}$

$^{149}Sm(^{32}S,4n\gamma)$ 1990Dr03

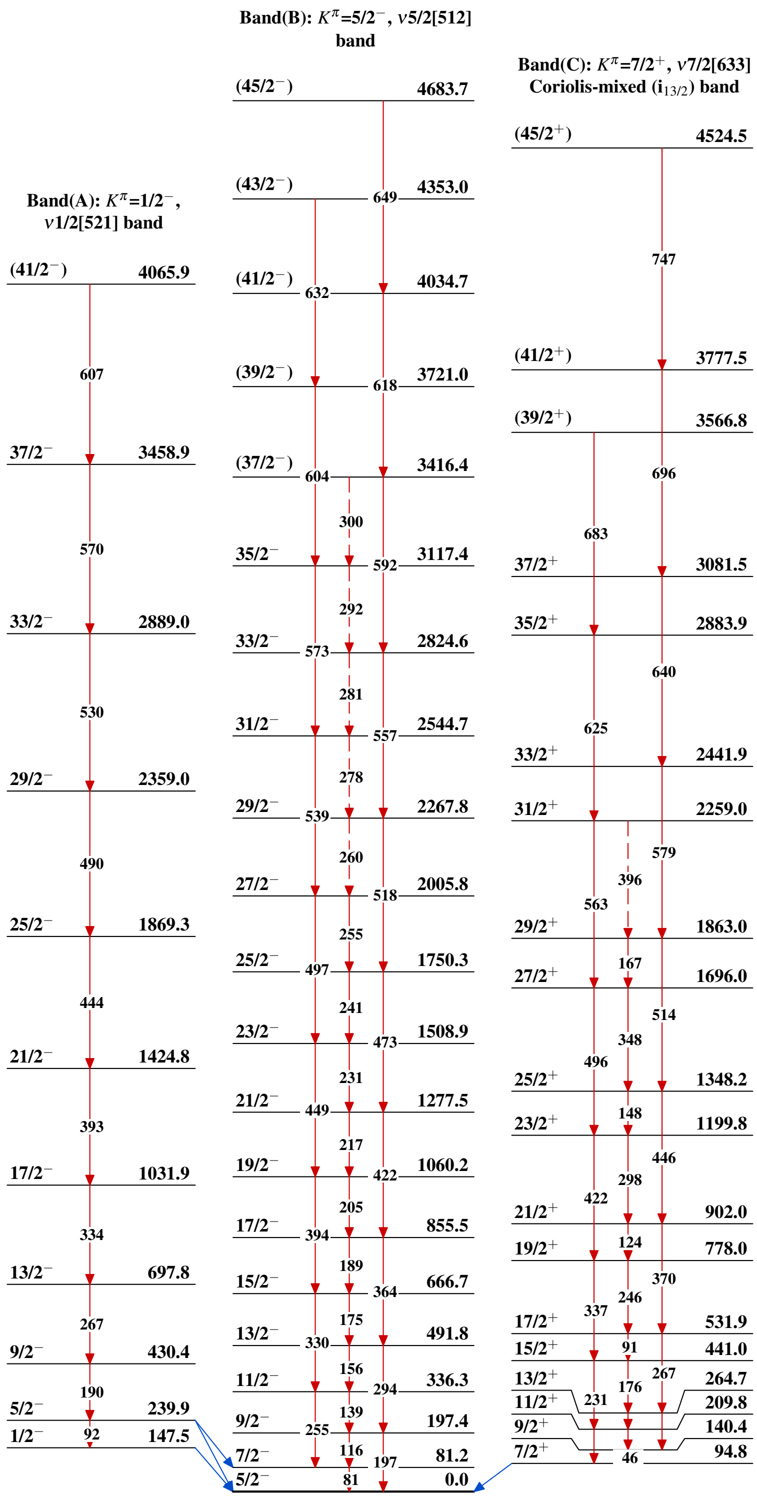
Level Scheme (continued)

Intensities: Relative I_γ



$^{177}_{78}Pt_{99}$

$^{149}Sm(^{32}S,4n\gamma)$ 1990Dr03



$^{177}_{78}Pt_{99}$