^{103}Rh(^{16}O,3nγ) 2004Mo02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111, 717 (2010)	1-Dec-2009

E=80 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma(\theta)$ using an array of seven HPGe detectors with BGO anti-Compton shields. One of the detectors was an LEPS detector.

^{116}I Levels

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	E(level)[†]	J$^\pi$	E(level)[†]	J$^\pi$
0.0	1$^+$	2.91 s	1097.3[#] 4	(10$^+$)	3461.8[f] 5	(16$^-$)
0+x			1132.2[a] 5	(10$^-$)	3527.0[&] 6	(17$^+$)
104.3 3			1260.4+x[d]	(12$^-$)	3563.8+x[d]	
214.2 4			1316.3[c] 6	(9$^-$)	3818.8[#] 6	(18$^+$)
227.0 3	(3$^+$)		1345.5[@] 5	(11$^+$)	3950.0[e] 6	(17$^-$)
320.3 5			1399.2[e] 5	(11$^-$)	4104.3[b] 6	(18$^-$)
341.1 4	(4$^+$)		1565.7[#] 5	(12$^+$)	4197.5[@] 6	(19$^+$)
376.5 4	(5$^+$)		1756.7[f] 5	(12$^-$)	4331.3[&] 6	(19$^+$)
386.1 5			1829.8[a] 5	(12$^-$)	4447.6[f] 6	(18$^-$)
430.4[e] 5	(7$^-$)	3.27 μs	1874.2[@] 5	(13$^+$)	4806.4[#] 7	(20$^+$)
468.5[a] 4	(8$^-$)		1933.2+x[d]		4980.0[b] 7	(20$^-$)
479.8 4			2143.7[e] 5	(13$^-$)	5186.6[@] 6	(21$^+$)
519.0 4			2185.8[c] 7		5248.0[&] 7	(21$^+$)
560.0[c] 5	(9$^-$)		2186.9[#] 5	(14$^+$)	5887.7[b] 7	(22$^-$)
570.7[f] 5	(8$^-$)		2532.7[@] 5	(15$^+$)	5938.8 7	(22$^-$)
571.6 4			2547.6[b] 5	(14$^-$)	6215.0[b] 7	(24$^-$)
647.8+x			2559.7[f] 5	(14$^-$)	6243.5[&] 7	(23$^+$)
664.5 5			2689.3 6		6262.3[@] 7	(23$^+$)
702.6+x			2709.4+x[d]		7170.1[&] 7	(25$^+$)
791.7[e] 5	(9$^-$)		2936.0[#] 5	(16$^+$)	7229.5 8	
874.3 4	(8$^+$)		2998.9[e] 5	(15$^-$)	8188.0 7	
1063.7 4	(9$^+$)		3293.4[@] 6	(17$^+$)		
1075.1[f] 5	(10$^-$)		3295.9[b] 5	(16$^-$)		

[†] From least-squares fit to Eγ's.
[‡] From Adopted Levels.
[#] Band(A): π1/2[550]ν3/2[541], α=0.
[@] Band(a): π1/2[550]ν3/2[541], α=1.
[&] Band(B): $\pi h_{11/2}\nu h_{11/2}$, At higher frequencies, crossing may be due to ν5/2[532] pair in the presence of π1/2[550]ν3/2[541].
[a] Band(C): π3/2[422]ν3/2[541], α=0.
[b] Band(c): π1/2[550]ν5/2[413] coupled to π3/2[422]^2 at low spins (16-20); above 20$^-$, it is non-collective with 24$^-$ as fully aligned 6 qp state: $\pi(h_{11/2}g^2_{7/2})\nu(g_{7/2}h^2_{11/2})$.
[c] Band(D): π3/2[422]ν3/2[541], α=1.
[d] Band(E): $\pi h_{11/2}\nu g_{7/2}$ coupled to Xe core rotational states.
[e] Band(F): π9/2[404]ν3/2[541], α=1.
[f] Band(f): π9/2[404]ν3/2[541], α=0.

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$\gamma(^{116}I)$

R(0°/117°) is the angular intensity ratio by setting gates on the 0° and 117° axes of $\gamma\gamma$ matrix; R≈1 if both the gating observed transitions are stretched and of the same mult; R≈0.6 if gate is on ΔJ=2 stretched and observed transition is ΔJ=1, dipole; R≈1.6 of gating transition is ΔJ=1 stretched dipole and observed transition is ΔJ=2 stretched. R values are for ΔJ=2, stretched quadrupole transitions, unless otherwise stated.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
33.6 *3*		1097.3	(10^+)	1063.7	(9^+)	M1+E2	
35.4 *3*		376.5	(5^+)	341.1	(4^+)		
39.2 *3*		519.0		479.8			
44.3[@] *3*		430.4	(7^-)	386.1			
50.5 *3*		519.0		468.5	(8^-)		
65.8[@] *3*		386.1		320.3			
91.5[#] *3*		560.0	(9^-)	468.5	(8^-)		
92.0[#] *3*	28.5 *15*	468.5	(8^-)	376.5	(5^+)	E3	R(0°/117°)=0.58 *16*.
103.1 *3*	8.1 *8*	571.6		468.5	(8^-)		Mult.: ΔJ=1 transition.
104.3 *3*		104.3		0.0	1^+		
106.1[@] *3*		320.3		214.2			
109.9[@] *3*		214.2		104.3			
114.1 *3*	92.5 *20*	341.1	(4^+)	227.0	(3^+)	M1+E2	R(0°/117°)=0.42 *8*.
138.7 *3*	9.7 *5*	479.8		341.1	(4^+)	[†]	R(0°/117°)=0.51 *18*.
140.3 *3*	25.0 *25*	570.7	(8^-)	430.4	(7^-)	M1	R(0°/117°)=0.61 *15*.
142.5 *3*	2.6 *6*	519.0		376.5	(5^+)	D[†]	R(0°/117°)=0.62 *25*.
149.5 *3*	8.9 *8*	376.5	(5^+)	227.0	(3^+)	E2	R(0°/117°)=0.8 *3*.
177.9 *3*	3.8 *7*	519.0		341.1	(4^+)		R(0°/117°)=0.9 *3*.
184.7 *3*	7.5 *4*	664.5		479.8		D[†]	R(0°/117°)=0.61 *23*.
189.4 *3*	45.5 *11*	1063.7	(9^+)	874.3	(8^+)	M1+E2	R(0°/117°)=0.37 *11*.
195.1 *3*	8.9 *7*	571.6		376.5	(5^+)		R(0°/117°)=0.7 *3*.
209.8 *3*	3.8 *6*	874.3	(8^+)	664.5		D[†]	R(0°/117°)=0.4 *3*.
220.2 *3*	8.1 *4*	1565.7	(12^+)	1345.5	(11^+)	M1+E2	Initial level listed as 1505.7 in authors′ table 1 is a misprint. R(0°/117°)=0.52 *9*.
221.0 *3*	28.5 *7*	791.7	(9^-)	570.7	(8^-)	M1+E2[‡]	R(0°/117°)=0.96 *8*.
223.0 *3*	27.7 *6*	1097.3	(10^+)	874.3	(8^+)	E2	R(0°/117°)=0.93 *3*.
227.0 *3*	100.0	227.0	(3^+)	0.0	1^+	E2	R(0°/117°)=0.98 *3*.
248.2 *3*	21.0 *5*	1345.5	(11^+)	1097.3	(10^+)	M1+E2	R(0°/117°)=0.48 *5*.
276.2 *3*	3.4 *4*	6215.0	(24^-)	5938.8	(22^-)	E2	R(0°/117°)=1.0 *3*.
283.4 *3*	22.0 *17*	1075.1	(10^-)	791.7	(9^-)	M1+E2[‡]	R(0°/117°)=1.01 *6*.
288[@]		664.5		376.5	(5^+)		
302.7 *3*	19.3 *9*	874.3	(8^+)	571.6		D[†]	R(0°/117°)=0.51 *7*.
308.5 *3*	22.5 *6*	1874.2	(13^+)	1565.7	(12^+)	M1+E2	R(0°/117°)=0.38 *8*.
312.7 *3*	<1	2186.9	(14^+)	1874.2	(13^+)	M1+E2	
324.1 *3*	18.1 *19*	1399.2	(11^-)	1075.1	(10^-)	M1+E2[‡]	R(0°/117°)=0.96 *7*.
327.3 *3*	12.0 *13*	6215.0	(24^-)	5887.7	(22^-)	E2	R(0°/117°)=0.96 *15*.
345.8 *3*	14.2 *5*	2532.7	(15^+)	2186.9	(14^+)	M1+E2	R(0°/117°)=0.47 *9*.
355.3 *3*	38.2 *8*	874.3	(8^+)	519.0		[†]	R(0°/117°)=0.48 *5*.
357.4 *3*	7.4 *6*	3293.4	(17^+)	2936.0	(16^+)	M1+E2	R(0°/117°)=0.45 *9*.
357.5 *3*	16.4 *13*	1756.7	(12^-)	1399.2	(11^-)	M1+E2[‡]	R(0°/117°)=1.06 *10*.
378.7 *3*	3.3 *4*	4197.5	(19^+)	3818.8	(18^+)	M1+E2	
387.0 *3*	9.8 *10*	2143.7	(13^-)	1756.7	(12^-)	M1+E2[‡]	R(0°/117°)=1.14 *12*.
403.9 *3*	5.1 *9*	2547.6	(14^-)	2143.7	(13^-)	M1+E2[‡]	R(0°/117°)=1.17 *8*.

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^{103}Rh(^{16}O,3nγ) 2004Mo02 (continued)

$\gamma(^{116}I)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
405.8 *3*	2.6 *4*	874.3	(8^+)	468.5	(8^-)		
416.0 *3*	5.6 *7*	2559.7	(14^-)	2143.7	(13^-)	M1+E2[‡]	R(0°/117°)=1.17 *13*.
439.2 *3*	2.1 *6*	2998.9	(15^-)	2559.7	(14^-)	M1+E2[‡]	R(0°/117°)=1.16 *18*.
462.9 *3*	2.1 *6*	3461.8	(16^-)	2998.9	(15^-)	M1+E2[‡]	R(0°/117°)=1.15 *20*.
468.4 *3*	61.4 *12*	1565.7	(12^+)	1097.3	(10^+)	E2	R(0°/117°)=1.07 *4*.
488.2 *3*	1.7 *5*	3950.0	(17^-)	3461.8	(16^-)	M1+E2	
497.6 *3*	1.2 *5*	4447.6	(18^-)	3950.0	(17^-)	M1+E2	
504.4 *3*	3.5 *6*	1075.1	(10^-)	570.7	(8^-)	E2[‡]	R(0°/117°)=1.67 *15*.
528.7 *3*	10.4 *8*	1874.2	(13^+)	1345.5	(11^+)	E2	R(0°/117°)=1.04 *8*.
537.3 *3*	4.5 *4*	1097.3	(10^+)	560.0	(9^-)	E1	R(0°/117°)=0.61 *15*.
557.8[@]		1260.4+x	(12^-)	702.6+x			
572.7[@]		1132.2	(10^-)	560.0	(9^-)		
595.2 *3*	8.5 *6*	1063.7	(9^+)	468.5	(8^-)	E1	R(0°/117°)=0.49 *8*.
607.5 *3*	5.5 *7*	1399.2	(11^-)	791.7	(9^-)	E2[‡]	R(0°/117°)=1.39 *15*.
612.6[@]		1260.4+x	(12^-)	647.8+x			
621.2 *3*	40.5 *10*	2186.9	(14^+)	1565.7	(12^+)	E2	R(0°/117°)=1.00 *5*.
647.8[@]		647.8+x		0+x			
658.5 *3*	19.7 *7*	2532.7	(15^+)	1874.2	(13^+)	E2	R(0°/117°)=1.08 *7*.
663.7 *3*	18.3 *11*	1132.2	(10^-)	468.5	(8^-)	E2	R(0°/117°)=0.95 *12*.
672.8[@]		1933.2+x		1260.4+x	(12^-)		
673.4 *3*	<1	2547.6	(14^-)	1874.2	(13^+)	E1	
681.6 *3*	7.1 *9*	1756.7	(12^-)	1075.1	(10^-)	E2[‡]	R(0°/117°)=1.92 *22*.
697.6 *3*	15.7 *10*	1829.8	(12^-)	1132.2	(10^-)	E2	R(0°/117°)=0.96 *13*.
717.8 *3*	10.1 *9*	2547.6	(14^-)	1829.8	(12^-)	E2	R(0°/117°)=0.99 *15*.
736.2 *3*	<1	3295.9	(16^-)	2559.7	(14^-)	E2	
744.5 *3*	6.6 *10*	2143.7	(13^-)	1399.2	(11^-)	E2[‡]	R(0°/117°)=1.68 *25*.
748.3 *3*	26.6 *11*	3295.9	(16^-)	2547.6	(14^-)	E2	R(0°/117°)=1.00 *8*.
749.1 *3*	21.0 *7*	2936.0	(16^+)	2186.9	(14^+)	E2	R(0°/117°)=1.16 *7*.
754.7 *3*	<1	1829.8	(12^-)	1075.1	(10^-)	E2	
756.3[@]		1316.3	(9^-)	560.0	(9^-)		
760.7 *3*	16.0 *7*	3293.4	(17^+)	2532.7	(15^+)	E2	R(0°/117°)=1.08 *8*.
763.2 *3*	<1	3295.9	(16^-)	2532.7	(15^+)	E1	
776.2[@]		2709.4+x		1933.2+x			
790.9 *3*	5.9 *6*	2547.6	(14^-)	1756.7	(12^-)	E2	R(0°/117°)=1.0 *3*.
803.0 *3*	4.6 *7*	2559.7	(14^-)	1756.7	(12^-)	E2	
804.3 *3*	9.0 *12*	4331.3	(19^+)	3527.0	(17^+)	E2	R(0°/117°)=1.10 *23*.
808.4 *3*	25.0 *9*	4104.3	(18^-)	3295.9	(16^-)	E2	R(0°/117°)=1.04 *15*.
854.4[@]		3563.8+x		2709.4+x			
855.2 *3*	3.2 *7*	2998.9	(15^-)	2143.7	(13^-)	E2	
859.5 *3*	<1	2689.3		1829.8	(12^-)		
869.5[@]		2185.8		1316.3	(9^-)		
875.7 *3*	22.6 *10*	4980.0	(20^-)	4104.3	(18^-)	E2	R(0°/117°)=1.08 *17*.
882.8 *3*	9.8 *4*	3818.8	(18^+)	2936.0	(16^+)	E2	(18^-) to (16^-) listed in authors′ table 1 is a misprint. R(0°/117°)=0.90 *10*.
902.1 *3*	2.5 *5*	3461.8	(16^-)	2559.7	(14^-)	E2	
904.1 *3*	10.5 *4*	4197.5	(19^+)	3293.4	(17^+)	E2	R(0°/117°)=1.15 *11*.
907.7 *3*	12.8 *8*	5887.7	(22^-)	4980.0	(20^-)	E2	R(0°/117°)=1.00 *20*.
907.8 *3*	8.0 *15*	7170.1	(25^+)	6262.3	(23^+)	E2	R(0°/117°)=1.2 *3*.
916.7 *3*	8.6 *14*	5248.0	(21^+)	4331.3	(19^+)	E2	R(0°/117°)=1.02 *25*.
926.6 *3*	6.6 *13*	7170.1	(25^+)	6243.5	(23^+)	E2	R(0°/117°)=1.0 *3*.
951.1 *3*	1.8 *4*	3950.0	(17^-)	2998.9	(15^-)	E2	
958.8 *3*	5.0 *5*	5938.8	(22^-)	4980.0	(20^-)	E2	(18^-) to (16^-) listed in authors′ table 1 is a misprint.

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^{103}Rh(^{16}O,3nγ) 2004Mo02 (continued)

$\gamma(^{116}I)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
985.8 *3*	0.9 *2*	4447.6	(18^-)	3461.8	(16^-)	E2	
987.6 *3*	2.7 *3*	4806.4	(20^+)	3818.8	(18^+)	E2	
989.1 *3*	8.2 *3*	5186.6	(21^+)	4197.5	(19^+)	E2	R(0°/117°)=1.10 *17*.
994.3 *3*	9.5 *18*	3527.0	(17^+)	2532.7	(15^+)	E2	R(0°/117°)=1.2 *3*.
995.5 *3*	7.5 *18*	6243.5	(23^+)	5248.0	(21^+)	E2	R(0°/117°)=1.0 *3*.
1014.5 *3*	6.7 *8*	7229.5		6215.0	(24^-)		
1017.9 *3*	8.2 *8*	8188.0		7170.1	(25^+)	†	R(0°/117°)=0.5 *3*.
1075.7 *3*	4.0 *4*	6262.3	(23^+)	5186.6	(21^+)	E2	

† ΔJ=1 transition from R(0°/117°).
‡ For gate on 140.3γ, ΔJ=1, M1 transition.
# Unresolved doublet.
@ From figure 1 of 2004Mo02; not listed in authors′ table 1.
& From R values.

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Level Scheme

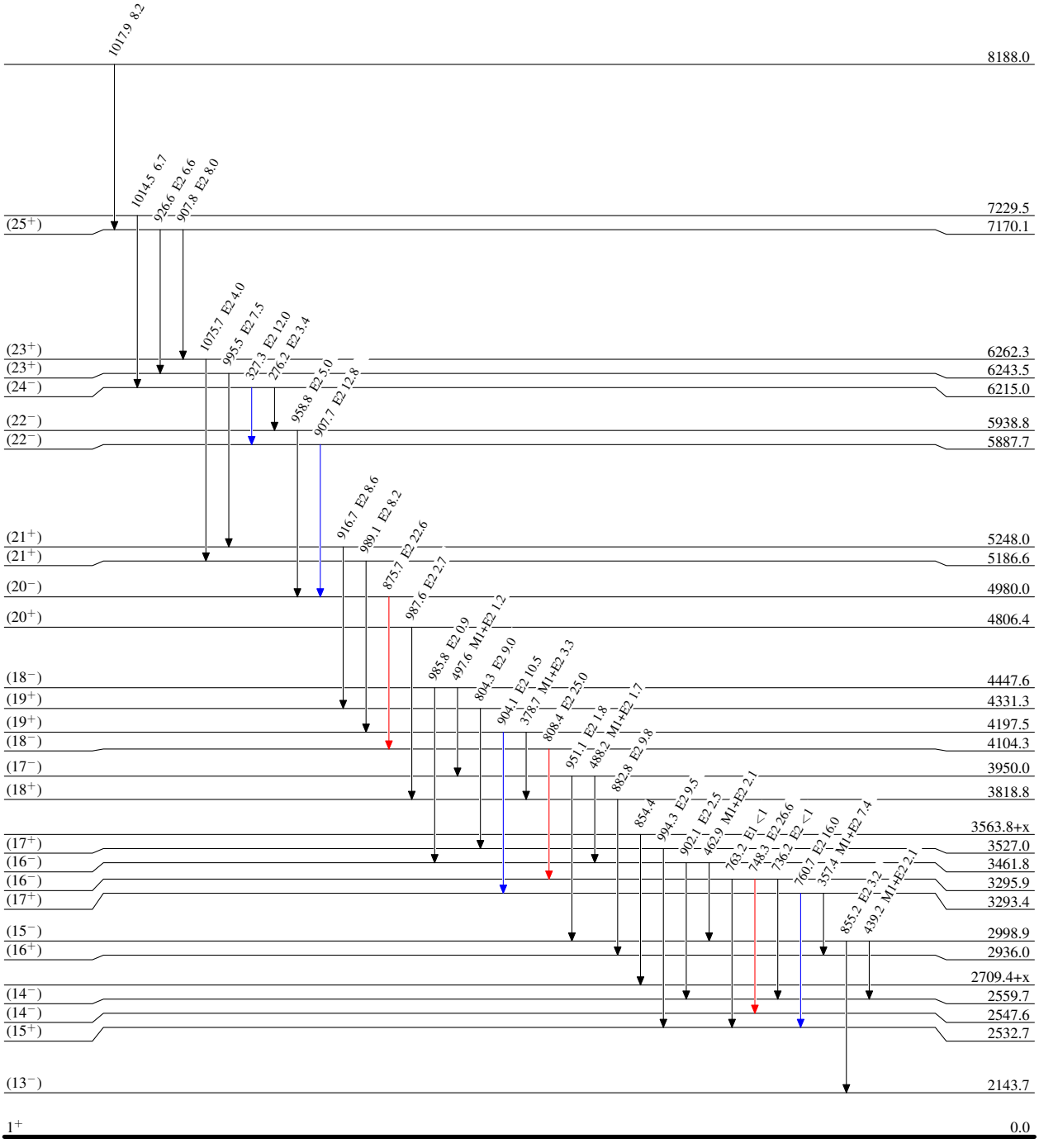
Intensities: Relative I_γ

Legend

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

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

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



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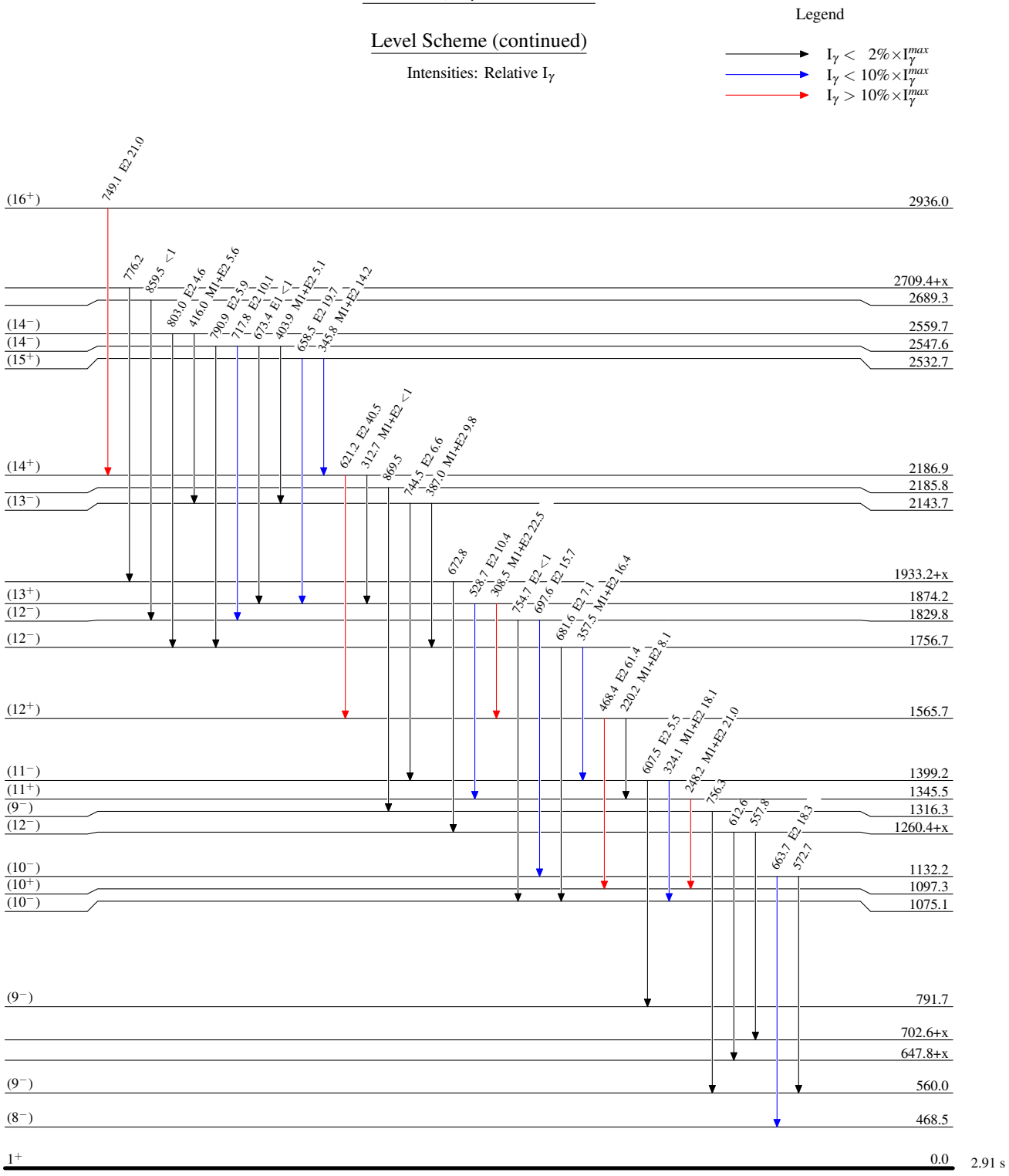
Level Scheme (continued)

Intensities: Relative I_γ



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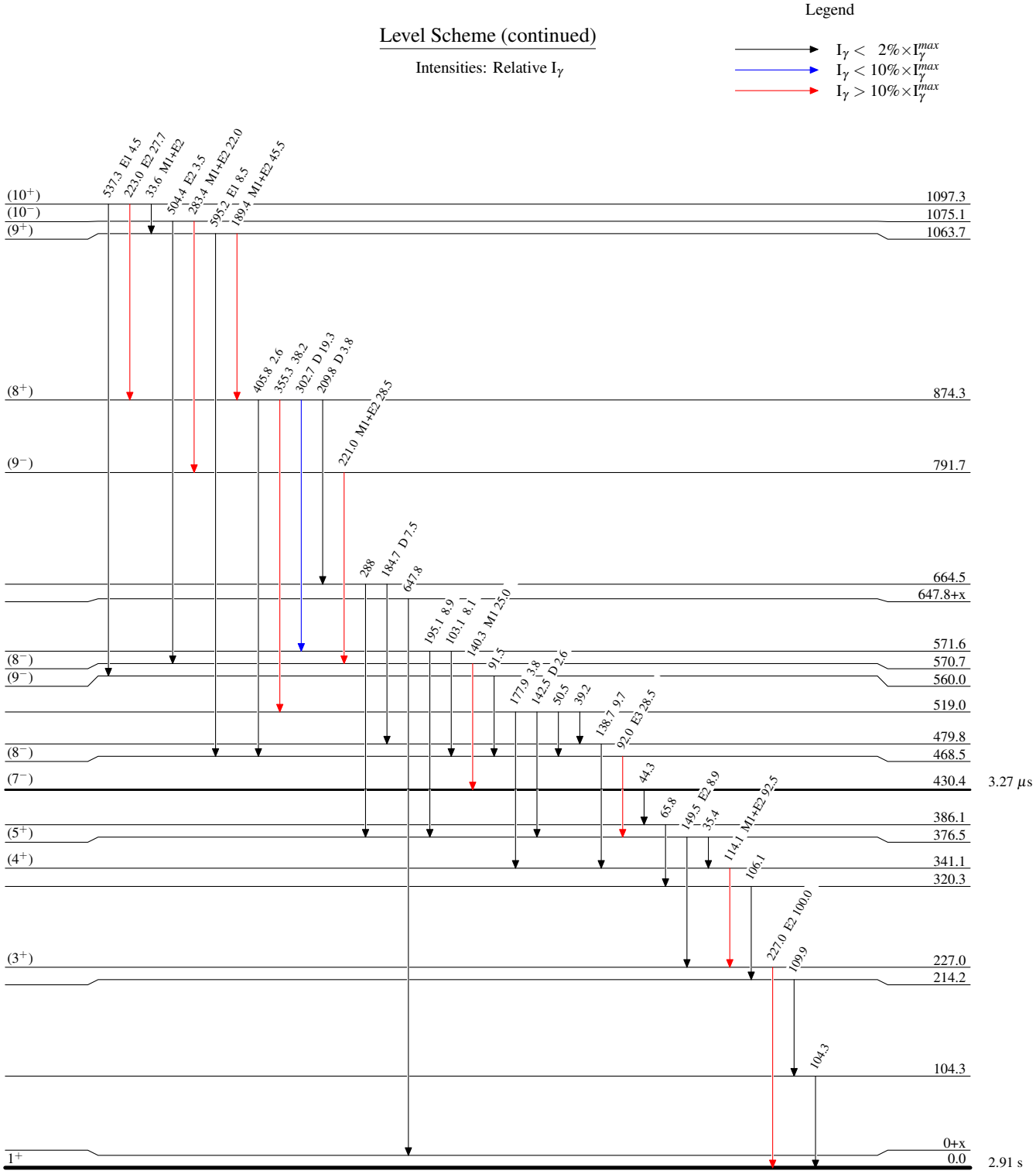
Level Scheme (continued)

Intensities: Relative I_γ



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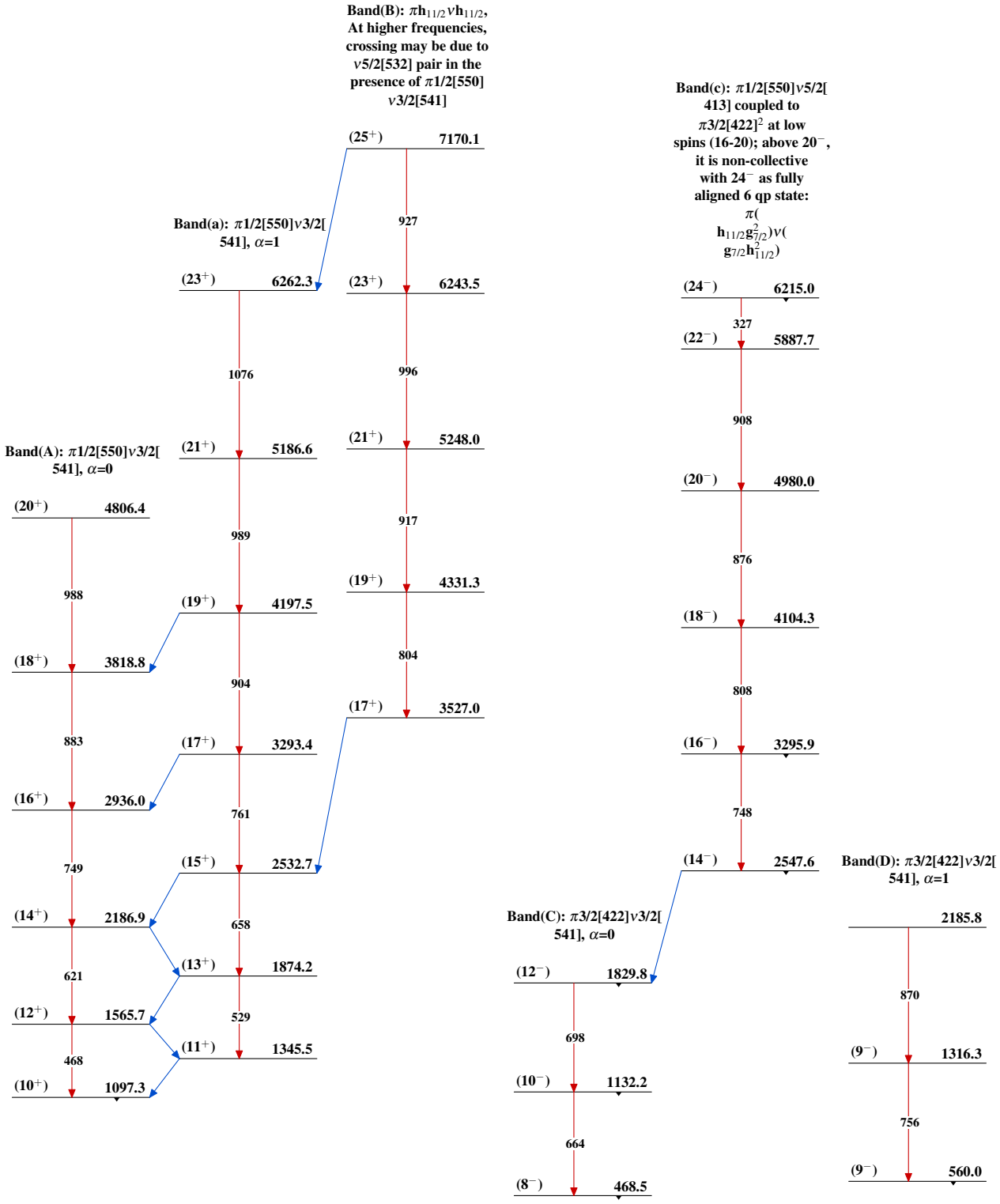

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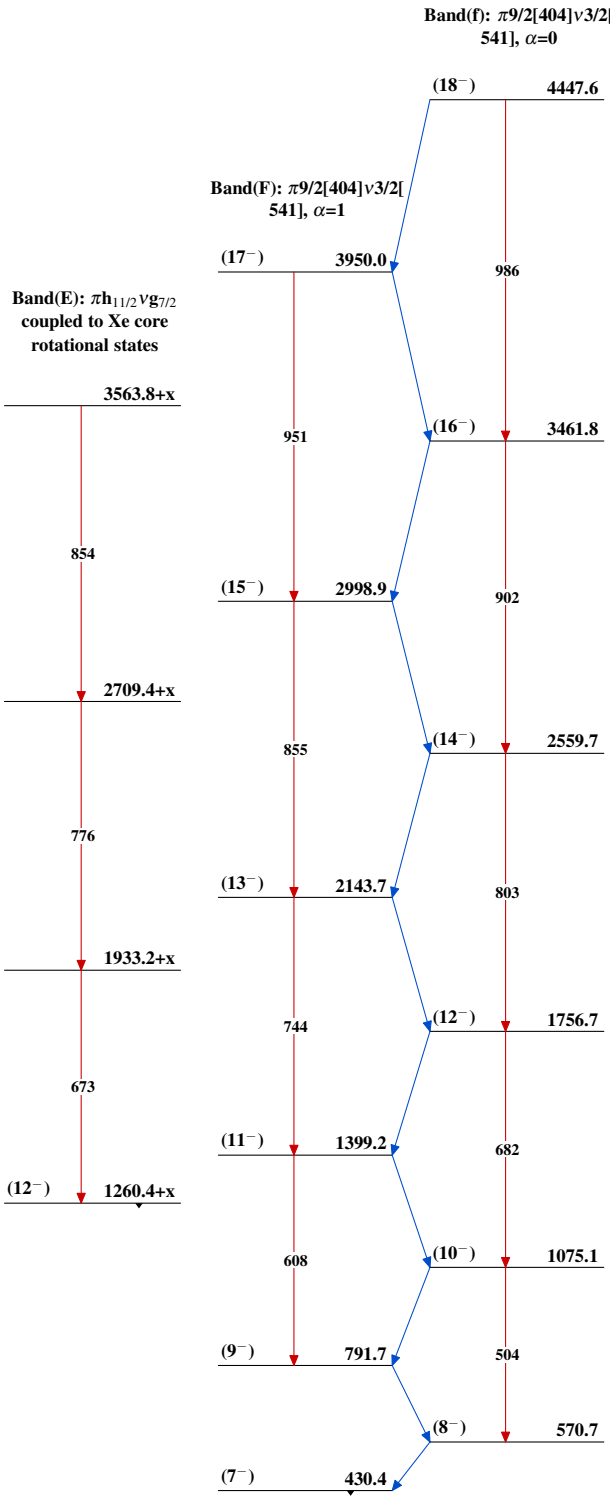

$^{116}_{53}I_{63}$