^{176}Yb(^{18}O,5nγ) 2009Hu12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson, Balraj Singh	NDS 142, 1 (2017)	15-Apr-2017

2009Hu12 (also 2009Hu17): ^{18}O beam produced at E=88,95 MeV by the tandem accelerator at the Japan Atomic Energy Agency. Gamma rays were detected using the GEMINI array, consisting of fourteen HPGe detectors with BGO anti-Compton shields. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) Results from this experiment were also published in 2009Hu17. There are some differences in the level schemes and DCO ratios. As 2009Hu12 has a more complete level scheme and was submitted for publication after the 2009Hu17 paper, the evaluators take the results from 2009Hu12.

2013He25: ^{18}O beam produced at E=87 MeV by HI-13 tandem accelerator at the China Institute of Atomic Energy (CIAE). Target=99% enriched ^{176}Yb 0.7 mg/cm^2 thick on a 2 mg/cm^2 thick gold foil. The γ rays were detected with an array of eleven Compton suppressed HPGe detectors and two planar HPGe detectors. Measured level lifetimes using RDDS method with a plunger system. Deduced transition quadrupole moments.

^{189}Pt Levels

E(level)	J$^\pi$[†]	T$_{1/2}$[‡]	Comments
0	3/2$^-$		
6.40[d] *4*	5/2$^-$		Additional information 1.
172.40 *10*	9/2$^-$	464 ns *25*	
191.30[&] *20*	(13/2$^+$)	143 μs *5*	
237.40[d] *10*	(9/2$^-$)		
356.70 *23*			
499.10[&] *20*	17/2$^+$	211.4[#] ps *55*	Q(transition)=11.05 eb *29* (2013He25).
531.20[a] *22*	(15/2$^+$)		J$^\pi$: From Adopted Levels.
608.60[d] *13*	(13/2$^-$)		
653.70 *20*	15/2$^+$		J$^\pi$: From Adopted Levels and author's assumption of an M1+E2 γ to 13/+ based on the DCO ratio.
711.90 *19*	13/2$^-$		
943.90[b] *23*	(17/2$^+$)		
954.90[&] *21*	21/2$^+$	175.4[#] ps *49*	Q(transition)=2.49 eb *7* (2013He25).
983.40[a] *23*	19/2$^+$		
1081.00[d] *15*	(17/2$^-$)		J$^\pi$: Assigned 15/2$^-$ in (α,3nγ).
1185.20 *20*	19/2$^+$		
1361.40 *18*	17/2$^-$		
1443.90[b] *23*	(21/2$^+$)		
1490.30[d] *17*	(21/2$^-$)		J$^\pi$: assigned 19/2$^-$ in (α,3nγ).
1512.00 *21*	21/2$^-$		
1529.20[&] *23*	25/2$^+$		
1555.6[a] *3*	23/2$^+$		
1695.60 *23*	(23/2$^-$)		
1714.20[e] *23*	(25/2$^-$)		
2009.40[b] *24*	(25/2$^+$)		
2055.10 *24*	(27/2$^-$)		
2189.40[&] *24*	29/2$^+$		
2219.3[a] *4*	(27/2$^+$)		
2291.30[f] *24*	(29/2$^-$)		
2303.60[e] *24*	(29/2$^-$)		
2539.6 *4*	(27/2$^+$)		
2620.30 *24*	(31/2$^-$)		
2635.40[b] *24*	(29/2$^+$)		
2688.30 *24*	(31/2$^-$)		

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^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

^{189}Pt Levels (continued)

E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†	E(level)	Jπ†
2729.3 *3*	(29/2$^+$)	3452.6[e] *4*	(37/2$^-$)	4367.7[@] *3*	(47/2$^+$)	5502.0[c] *4*	(53/2$^-$)
2818.5 *5*		3455.3 *3*	(35/2$^+$)	4437.1 *3*	(43/2$^-$)	6474.7[c] *5*	(57/2$^-$)
2839.70[e] *25*	(33/2$^-$)	3574.0[f] *4*	(37/2$^-$)	4647.3[&] *7*	(45/2$^+$)	6476.4[@] *4*	(55/2$^+$)
2864.6[&] *3*	33/2$^+$	3582.2[b] *3*	(37/2$^+$)	4686.1 *3*	(45/2$^+$)	6761.8[c] *7*	
2874.1[f] *3*	(33/2$^-$)	3640.6[@] *3*	(39/2$^+$)	4688.0 *3*	(45/2$^-$)	6841.5[@] *5*	(57/2$^+$)
2931.5[a] *4*	(31/2$^+$)	3648.6 *3*	(39/2$^-$)	4708.3 *3*	(47/2$^+$)	7272.2[@] *7*	
2979.2 *3*	(31/2$^+$)	3672.8 *6*		4795.2 *3*	(45/2$^-$)	7357.9[c] *9*	
3066.1 *4*	(33/2$^+$)	3809.2 *3*	(41/2$^-$)	4848.6 *4*	(45/2$^-$)	7582.4 *7*	
3200.90[b] *24*	(33/2$^+$)	3848.5[@] *3*	(43/2$^+$)	4879.2[@] *3*	(49/2$^+$)	7764.7[@] *9*	
3292.30 *24*	(35/2$^-$)	3946.9[&] *5*	(41/2$^+$)	5042.2[c] *3*	(49/2$^-$)	8135.2[c] *10*	
3376.3[&] *4*	(37/2$^+$)	3975.9[b] *6*		5353.6[@] *4*	(53/2$^+$)	8843.0[c] *11*	
3420.0 *3*	(35/2$^+$)	4168.5[e] *6*	(41/2$^-$)	5464.4[&] *9*	(49/2$^+$)		

† The authors based Jπ assignments on DCO ratios, assuming stretched quadrupoles to be E2, stretched dipoles to be E1 or M1, with mixed multipolarity to be M1+E2, along with yrast arguments. In addition, assignments were made based on the expectation that spin values increase with excitation energy. These are in general agreement with assignments from (α,3nγ), with exceptions noted, until 2865 keV, the highest level observed there.

‡ From Adopted Levels unless otherwise stated.

From 2013He25 using the recoil distance (RDDS) with a plunger system.

@ Band(A): γ cascade based on (39/2$^+$). Structure #3 in 2009Hu12.

& Band(B): 13/2$^+$ band,α=+1/2.

[a] Band(b): 13/2$^+$ band,α=−1/2.

[b] Band(C): Band based on (17/2$^+$). Structure #2 in 2009Hu12.

[c] Band(D): γ cascade based on (49/2$^-$). Structure #4 in 2009Hu12.

[d] Band(E): Band based on 5/2$^-$,α=+1/2.

[e] Band(F): ΔJ=2 band based on (25/2$^-$). Part of structure #1 in 2009Hu12 interpreted as pair of pseudospin partners with configuration=$\nu i^{-2}_{13/2}\otimes \nu(f_{5/2}/p_{3/2})$.

[f] Band(G): ΔJ=2 band based on (29/2$^-$). Part of structure #1 in 2009Hu12 interpreted as pair of pseudospin partners with configuration=$\nu i^{-2}_{13/2}\otimes \nu(f_{5/2}/p_{3/2})$.

γ(^{189}Pt)

The DCO ratios should be ≈1.0 when the gating and measured transitions have the same multipolarity and <1.0 otherwise. Based on authors′ DCO ratios and level scheme placements, the evaluators assume E2 transitions were always used as gates.

Eγ‡	Iγ#	Ei(level)	Jiπ	Ef	Jfπ	Mult.†	α@	Comments
(18.6)		1714.20	(25/2$^-$)	1695.60	(23/2$^-$)			
(21.7)		1512.00	21/2$^-$	1490.30	(21/2$^-$)			
(58.4)		3640.6	(39/2$^+$)	3582.2	(37/2$^+$)			
91.4 *3*	3.5 *11*	3292.30	(35/2$^-$)	3200.90	(33/2$^+$)	D		DCO=0.57 *8*
128.9 *1*	12.6 *19*	1490.30	(21/2$^-$)	1361.40	17/2$^-$	(E2)	1.77	DCO=1.03 *18* α(K)=0.473 *7*; α(L)=0.977 *15*; α(M)=0.252 *4* α(N)=0.0615 *9*; α(O)=0.00963 *14*; α(P)=4.68×10^{-5} *7*
134.8 *5*		3200.90	(33/2$^+$)	3066.1	(33/2$^+$)			
150.6 *3*	3.5 *11*	1512.00	21/2$^-$	1361.40	17/2$^-$	(E2)	0.985 *16*	DCO=1.0 *4* α(K)=0.338 *5*; α(L)=0.486 *8*; α(M)=0.1251 *21*

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^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								α(N)=0.0305 *5*; α(O)=0.00480 *8*; α(P)=3.22×10^{-5} *5*
160.6 *1*	13.6 *20*	3809.2	(41/2$^-$)	3648.6	(39/2$^-$)	D+Q		DCO=0.83 *7*
163.0 *5*	2.8 *8*	3455.3	(35/2$^+$)	3292.30	(35/2$^-$)			
166.0 *1*	>3.5	172.40	9/2$^-$	6.40	5/2$^-$	E2	0.690	DCO=1.06 *13* α(K)=0.269 *4*; α(L)=0.317 *5*; α(M)=0.0813 *12* α(N)=0.0199 *3*; α(O)=0.00314 *5*; α(P)=2.54×10^{-5} *4* Mult.: from Adopted Gammas.
170.9 *3*	4.3 *13*	4879.2	(49/2$^+$)	4708.3	(47/2$^+$)	D+Q		DCO=0.66 *13*
183.6 *1*	91 *5*	1695.60	(23/2$^-$)	1512.00	21/2$^-$	D+Q		DCO=0.82 *7*
185.3 *1*	17.5 *26*	3640.6	(39/2$^+$)	3455.3	(35/2$^+$)	(E2)	0.467	DCO=1.02 *12* α(K)=0.206 *3*; α(L)=0.197 *3*; α(M)=0.0504 *8* α(N)=0.01232 *18*; α(O)=0.00195 *3*; α(P)=1.95×10^{-5} *3*
188.0 *3*	4.3 *13*	3640.6	(39/2$^+$)	3452.6	(37/2$^-$)	D	0.0819	DCO=0.66 *17* α(K)=0.0672 *10*; α(L)=0.01135 *17*; α(M)=0.00262 *4* α(N)=0.000641 *10*; α(O)=0.0001105 *17*; α(P)=5.81×10^{-6} *9*
189.7 *5*		2729.3	(29/2$^+$)	2539.6	(27/2$^+$)			
193.1 *1*	10.6 *16*	4879.2	(49/2$^+$)	4686.1	(45/2$^+$)	(E2)	0.405	DCO=1.02 *13* α(K)=0.185 *3*; α(L)=0.1654 *24*; α(M)=0.0423 *6* α(N)=0.01033 *15*; α(O)=0.001641 *24*; α(P)=1.767×10^{-5} *25*
193.6 *5*	2.0 *6*	5042.2	(49/2$^-$)	4848.6	(45/2$^-$)	(E2)	0.402 *7*	DCO=1.1 *3* α(K)=0.184 *3*; α(L)=0.164 *3*; α(M)=0.0418 *8* α(N)=0.01021 *19*; α(O)=0.00162 *3*; α(P)=1.76×10^{-5} *3*
202.2 *1*	24.4 *12*	1714.20	(25/2$^-$)	1512.00	21/2$^-$	(E2)	0.346	DCO=1.06 *9* α(K)=0.1653 *24*; α(L)=0.1362 *20*; α(M)=0.0347 *5* α(N)=0.00849 *12*; α(O)=0.001353 *20*; α(P)=1.581×10^{-5} *23*
207.9 *1*	43.5 *22*	3848.5	(43/2$^+$)	3640.6	(39/2$^+$)	(E2)	0.315	DCO=1.08 *8* α(K)=0.1541 *22*; α(L)=0.1213 *18*; α(M)=0.0309 *5* α(N)=0.00756 *11*; α(O)=0.001205 *17*; α(P)=1.478×10^{-5} *21*
219.1 *3*	5.3 *8*	3420.0	(35/2$^+$)	3200.90	(33/2$^+$)	D+Q		DCO=0.78 *10*
220.6 *1*	11.8 *18*	3640.6	(39/2$^+$)	3420.0	(35/2$^+$)	(E2)	0.259	DCO=1.07 *11* α(K)=0.1326 *19*; α(L)=0.0949 *14*; α(M)=0.0241 *4* α(N)=0.00590 *9*; α(O)=0.000944 *14*; α(P)=1.282×10^{-5} *18*
231.0 *1*	17 *3*	237.40	(9/2$^-$)	6.40	5/2$^-$	E2	0.222	DCO=1.19 *11* α(K)=0.1180 *17*; α(L)=0.0786 *11*; α(M)=0.0200 *3* α(N)=0.00488 *7*; α(O)=0.000783 *11*; α(P)=1.147×10^{-5} *17* Mult.: from Adopted Gammas; consistent with DCO.
236.2 *3*	7.7 *12*	2291.30	(29/2$^-$)	2055.10	(27/2$^-$)	D+Q		DCO=0.82 *9*
247.0 *3*	8.7 *13*	5042.2	(49/2$^-$)	4795.2	(45/2$^-$)	(E2)	0.179	DCO=1.13 *11* α(K)=0.0996 *15*; α(L)=0.0601 *9*;

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^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								α(M)=0.01520 *23* α(N)=0.00372 *6*; α(O)=0.000598 *9*; α(P)=9.77×10^{-6} *14*
248.5 *3*	7.5 *11*	2303.60	(29/2$^-$)	2055.10	(27/2$^-$)	D+Q		DCO=0.78 *10*
249.9 *3*	<7.0	2979.2	(31/2$^+$)	2729.3	(29/2$^+$)			
250.9 *1*	17.2 *25*	4688.0	(45/2$^-$)	4437.1	(43/2$^-$)	D+Q		DCO=0.54 *5*
251.9 *3*	3.8 *11*	608.60	(13/2$^-$)	356.70				
254.4 *3*	4.1 *12*	3455.3	(35/2$^+$)	3200.90	(33/2$^+$)	D+Q		DCO=0.56 *11*
280.4 *3*	3.4 *10*	1361.40	17/2$^-$	1081.00	(17/2$^-$)	(E2)	0.1207	DCO=1.04 *15* α(K)=0.0723 *11*; α(L)=0.0366 *6*; α(M)=0.00919 *14* α(N)=0.00225 *4*; α(O)=0.000365 *6*; α(P)=7.22×10^{-6} *11*
287.1 *5*	1.6 *5*	6761.8		6474.7	(57/2$^-$)			
290.2 *5*		943.90	(17/2$^+$)	653.70	15/2$^+$			
307.8 *1*	144 *7*	499.10	17/2$^+$	191.30	(13/2$^+$)	E2	0.0913	DCO=1.03 *8* α(K)=0.0573 *8*; α(L)=0.0257 *4*; α(M)=0.00643 *9* α(N)=0.001575 *23*; α(O)=0.000257 *4*; α(P)=5.79×10^{-6} *9*
316.7 *1*	14.1 *21*	2620.30	(31/2$^-$)	2303.60	(29/2$^-$)	D+Q		DCO=0.40 *4*
318.4 *3*	3.4 *10*	4686.1	(45/2$^+$)	4367.7	(47/2$^+$)			
326.8 *1*	28.9 *14*	1512.00	21/2$^-$	1185.20	19/2$^+$	D		DCO=0.69 *5*
329.0 *3*	5.9 *9*	2620.30	(31/2$^-$)	2291.30	(29/2$^-$)	D+Q		DCO=0.84 *19*
333.9 *3*	7.8 *12*	5042.2	(49/2$^-$)	4708.3	(47/2$^+$)	D		DCO=0.60 *8*
339.9 *1*	>22.9	531.20	(15/2$^+$)	191.30	(13/2$^+$)	D+Q		DCO=0.44 *8* Mult.: M1+E2 in 2009Hu12.
340.6 *3*	7.3 *11*	4708.3	(47/2$^+$)	4367.7	(47/2$^+$)			
340.9 *1*	70 *3*	2055.10	(27/2$^-$)	1714.20	(25/2$^-$)	D+Q		DCO=0.86 *4*
350.3 *3*	3.4 *10*	356.70		6.40	5/2$^-$			
353.9 *5*	2.2 *7*	3420.0	(35/2$^+$)	3066.1	(33/2$^+$)			
354.2 *3*	8.5 *13*	5042.2	(49/2$^-$)	4688.0	(45/2$^-$)	(E2)	0.0610	DCO=1.06 *11* α(K)=0.0406 *6*; α(L)=0.01542 *22*; α(M)=0.00383 *6* α(N)=0.000939 *14*; α(O)=0.0001547 *23*; α(P)=4.17×10^{-6} *6*
356.3 *1*	35.3 *18*	3648.6	(39/2$^-$)	3292.30	(35/2$^-$)	(E2)	0.0600	DCO=1.06 *12* α(K)=0.0401 *6*; α(L)=0.01510 *22*; α(M)=0.00375 *6* α(N)=0.000919 *13*; α(O)=0.0001515 *22*; α(P)=4.12×10^{-6} *6*
365.1 *3*	5.3 *8*	6841.5	(57/2$^+$)	6476.4	(55/2$^+$)	D+Q		DCO=0.86 *14*
371.2 *1*	34.0 *17*	608.60	(13/2$^-$)	237.40	(9/2$^-$)	(E2)	0.0536	DCO=1.10 *8* α(K)=0.0363 *5*; α(L)=0.01308 *19*; α(M)=0.00324 *5* α(N)=0.000794 *12*; α(O)=0.0001313 *19*; α(P)=3.75×10^{-6} *6*
381.3 *1*	10.6 *16*	3582.2	(37/2$^+$)	3200.90	(33/2$^+$)	(E2)	0.0498	DCO=1.03 *13* α(K)=0.0341 *5*; α(L)=0.01192 *17*; α(M)=0.00295 *5* α(N)=0.000723 *11*; α(O)=0.0001197 *17*; α(P)=3.52×10^{-6} *5*
393.7 *5*		3975.9		3582.2	(37/2$^+$)			
397.0 *3*	7.7 *12*	2688.30	(31/2$^-$)	2291.30	(29/2$^-$)	D+Q		DCO=0.78 *13*
409.3 *1*	36.2 *18*	1490.30	(21/2$^-$)	1081.00	(17/2$^-$)	(E2)	0.0412	DCO=1.13 *11* α(K)=0.0288 *4*; α(L)=0.00938 *14*;

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^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								α(M)=0.00231 *4* α(N)=0.000566 *8*; α(O)=9.43×10^{-5} *14*; α(P)=3.00×10^{-6} *5*
412.7 *1*	10.1 *15*	943.90	(17/2$^+$)	531.20	(15/2$^+$)	D+Q		DCO=0.55 *6*
418.2 *3*	3.5 *11*	3292.30	(35/2$^-$)	2874.1	(33/2$^-$)	D+Q		DCO=0.45 *7*
430.7 *5*	2.8 *8*	7272.2		6841.5	(57/2$^+$)			
439.6 *5*		2979.2	(31/2$^+$)	2539.6	(27/2$^+$)			
440.8 *5*		3420.0	(35/2$^+$)	2979.2	(31/2$^+$)			
444.8 *5*	3.0 *9*	943.90	(17/2$^+$)	499.10	17/2$^+$	(E2)	0.0332	DCO=1.05 *13* α(K)=0.0238 *4*; α(L)=0.00714 *11*; α(M)=0.00175 *3* α(N)=0.000429 *7*; α(O)=7.18×10^{-5} *11*; α(P)=2.49×10^{-6} *4*
452.2 *1*	12.8 *19*	983.40	19/2$^+$	531.20	(15/2$^+$)	(E2)	0.0318	DCO=1.04 *11* α(K)=0.0229 *4*; α(L)=0.00677 *10*; α(M)=0.001654 *24* α(N)=0.000406 *6*; α(O)=6.82×10^{-5} *10*; α(P)=2.40×10^{-6} *4*
452.6 *3*	4.5 *14*	3292.30	(35/2$^-$)	2839.70	(33/2$^-$)	D+Q		DCO=0.85 *11*
455.8 *1*	100 *5*	954.90	21/2$^+$	499.10	17/2$^+$	(E2)	0.0312	DCO=1.10 *5* α(K)=0.0225 *4*; α(L)=0.00660 *10*; α(M)=0.001612 *23* α(N)=0.000396 *6*; α(O)=6.65×10^{-5} *10*; α(P)=2.36×10^{-6} *4*
459.8 *1*	20 *3*	5502.0	(53/2$^-$)	5042.2	(49/2$^-$)	(E2)	0.0305	DCO=1.07 *11* α(K)=0.0220 *3*; α(L)=0.00642 *9*; α(M)=0.001567 *22* α(N)=0.000385 *6*; α(O)=6.46×10^{-5} *9*; α(P)=2.31×10^{-6} *4*
460.5 *3*	4.0 *12*	1443.90	(21/2$^+$)	983.40	19/2$^+$	D+Q		DCO=0.61 *11*
462.4 *1*	>25.9	653.70	15/2$^+$	191.30	(13/2$^+$)	D+Q		DCO=0.59 *10* Mult.: M1+E2 in 2009Hu12.
472.4 *1*	41.6 *21*	1081.00	(17/2$^-$)	608.60	(13/2$^-$)	(E2)	0.0285	DCO=1.07 *7* α(K)=0.0207 *3*; α(L)=0.00589 *9*; α(M)=0.001436 *21* α(N)=0.000353 *5*; α(O)=5.94×10^{-5} *9*; α(P)=2.18×10^{-6} *3*
473.8 *5*		3292.30	(35/2$^-$)	2818.5				
474.4 *1*	24.9 *12*	5353.6	(53/2$^+$)	4879.2	(49/2$^+$)	(E2)	0.0282	DCO=0.93 *8* α(K)=0.0205 *3*; α(L)=0.00581 *9*; α(M)=0.001417 *20* α(N)=0.000348 *5*; α(O)=5.86×10^{-5} *9*; α(P)=2.16×10^{-6} *3*
476.1 *3*	7.5 *11*	3455.3	(35/2$^+$)	2979.2	(31/2$^+$)			
484.3 *3*	6.5 *10*	983.40	19/2$^+$	499.10	17/2$^+$	D+Q		DCO=0.47 *11*
492.5 *5*		7764.7		7272.2				
500.0 *1*	13.2 *20*	1443.90	(21/2$^+$)	943.90	(17/2$^+$)	(E2)	0.0248	DCO=1.05 *15* α(K)=0.0183 *3*; α(L)=0.00494 *7*; α(M)=0.001200 *17* α(N)=0.000295 *5*; α(O)=4.98×10^{-5} *7*; α(P)=1.92×10^{-6} *3*
511.5 *3*	6.1 *9*	4879.2	(49/2$^+$)	4367.7	(47/2$^+$)	D+Q		DCO=0.81 *15*
511.7 *3*	7.5 *11*	3376.3	(37/2$^+$)	2864.6	33/2$^+$	(E2)	0.0234	DCO=1.17 *13* α(K)=0.01736 *25*; α(L)=0.00460 *7*; α(M)=0.001117 *16*

Continued on next page (footnotes at end of table)

^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
								α(N)=0.000275 *4*; α(O)=4.65×10^{-5} *7*; α(P)=1.83×10^{-6} *3*
519.2 *1*	20 *3*	4367.7	(47/2$^+$)	3848.5	(43/2$^+$)	(E2)	0.0226	DCO=1.02 *11* α(K)=0.01681 *24*; α(L)=0.00441 *7*; α(M)=0.001068 *15* α(N)=0.000262 *4*; α(O)=4.45×10^{-5} *7*; α(P)=1.772×10^{-6} *25*
523.8 *5*	2.0 *6*	3455.3	(35/2$^+$)	2931.5	(31/2$^+$)	(E2)	0.0221	DCO=1.03 *13* α(K)=0.01649 *24*; α(L)=0.00429 *7*; α(M)=0.001039 *15* α(N)=0.000255 *4*; α(O)=4.33×10^{-5} *7*; α(P)=1.739×10^{-6} *25*
531.5 *1*	13.0 *20*	1185.20	19/2$^+$	653.70	15/2$^+$	(E2)	0.0214	DCO=0.96 *24* α(K)=0.01597 *23*; α(L)=0.00411 *6*; α(M)=0.000994 *14* α(N)=0.000244 *4*; α(O)=4.15×10^{-5} *6*; α(P)=1.685×10^{-6} *24*
536.1 *1*	17.1 *25*	2839.70	(33/2$^-$)	2303.60	(29/2$^-$)	(E2)	0.0209	DCO=1.05 *10* α(K)=0.01567 *22*; α(L)=0.00401 *6*; α(M)=0.000968 *14* α(N)=0.000238 *4*; α(O)=4.04×10^{-5} *6*; α(P)=1.654×10^{-6} *24*
539.5[&] *3*	11.5[&] *17*	711.90	13/2$^-$	172.40	9/2$^-$	(E2)	0.0206	DCO=1.17 *12* α(K)=0.01546 *22*; α(L)=0.00393 *6*; α(M)=0.000950 *14* α(N)=0.000234 *4*; α(O)=3.97×10^{-5} *6*; α(P)=1.632×10^{-6} *23*
539.9[&] *3*	2.9[&] *9*	2729.3	(29/2$^+$)	2189.40	29/2$^+$	(E2)	0.0206	DCO=0.97 *8* α(K)=0.01543 *22*; α(L)=0.00392 *6*; α(M)=0.000948 *14* α(N)=0.000233 *4*; α(O)=3.96×10^{-5} *6*; α(P)=1.629×10^{-6} *23*
548.4 *3*	7.8 *12*	2839.70	(33/2$^-$)	2291.30	(29/2$^-$)	(E2)	0.0198	DCO=0.94 *11* α(K)=0.01492 *21*; α(L)=0.00375 *6*; α(M)=0.000904 *13* α(N)=0.000222 *4*; α(O)=3.78×10^{-5} *6*; α(P)=1.576×10^{-6} *23*
557.1 *1*	34.6 *17*	1512.00	21/2$^-$	954.90	21/2$^+$	D		DCO=1.02 *6*
565.2 *1*	12.2 *18*	2620.30	(31/2$^-$)	2055.10	(27/2$^-$)	(E2)	0.0185	DCO=0.95 *14* α(K)=0.01398 *20*; α(L)=0.00343 *5*; α(M)=0.000827 *12* α(N)=0.000203 *3*; α(O)=3.47×10^{-5} *5*; α(P)=1.478×10^{-6} *21*
565.5[&] *1*	<18.5[&]	2009.40	(25/2$^+$)	1443.90	(21/2$^+$)			
565.5[&] *1*	23.4[&] *12*	3200.90	(33/2$^+$)	2635.40	(29/2$^+$)	(E2)	0.0185	DCO=1.03 *11* α(K)=0.01396 *20*; α(L)=0.00343 *5*; α(M)=0.000825 *12* α(N)=0.000203 *3*; α(O)=3.46×10^{-5} *5*; α(P)=1.476×10^{-6} *21*
570.6 *3*	3.8 *11*	3946.9	(41/2$^+$)	3376.3	(37/2$^+$)	(E2)	0.0181	DCO=1.01 *15* α(K)=0.01370 *20*; α(L)=0.00334 *5*; α(M)=0.000804 *12* α(N)=0.000198 *3*; α(O)=3.37×10^{-5} *5*; α(P)=1.448×10^{-6} *21*

Continued on next page (footnotes at end of table)

^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[@]	Comments
572.2 *3*	7.8 *12*	1555.6	$23/2^+$	983.40	$19/2^+$	(E2)	0.0180	DCO=1.05 *9* α(K)=0.01362 *20*; α(L)=0.00331 *5*; α(M)=0.000797 *12* α(N)=0.000196 *3*; α(O)=3.35×10^{-5} *5*; α(P)=1.440×10^{-6} *21*
574.3 *1*	40.6 *20*	1529.20	$25/2^+$	954.90	$21/2^+$	(E2)	0.01780	DCO=0.94 *8* α(K)=0.01351 *19*; α(L)=0.00328 *5*; α(M)=0.000789 *11* α(N)=0.000194 *3*; α(O)=3.31×10^{-5} *5*; α(P)=1.428×10^{-6} *20*
577.1 *1*	49.8 *25*	2291.30	$(29/2^-)$	1714.20	$(25/2^-)$	(E2)	0.01760	DCO=0.99 *7* α(K)=0.01337 *19*; α(L)=0.00323 *5*; α(M)=0.000778 *11* α(N)=0.000191 *3*; α(O)=3.27×10^{-5} *5*; α(P)=1.414×10^{-6} *20*
580.3 *3*	3.9 *12*	3420.0	$(35/2^+)$	2839.70	$(33/2^-)$	D		DCO=0.50 *10*
582.8 *1*	22.6 *11*	2874.1	$(33/2^-)$	2291.30	$(29/2^-)$	(E2)	0.01721	DCO=1.01 *11* α(K)=0.01309 *19*; α(L)=0.00314 *5*; α(M)=0.000756 *11* α(N)=0.000186 *3*; α(O)=3.18×10^{-5} *5*; α(P)=1.385×10^{-6} *20*
589.4 *1*	33.8 *17*	2303.60	$(29/2^-)$	1714.20	$(25/2^-)$	(E2)	0.01677	DCO=1.13 *13* α(K)=0.01278 *18*; α(L)=0.00304 *5*; α(M)=0.000731 *11* α(N)=0.000180 *3*; α(O)=3.08×10^{-5} *5*; α(P)=1.352×10^{-6} *19*
596.1 *5*		7357.9		6761.8				
600.7 *5*	1.7 *5*	1555.6	$23/2^+$	954.90	$21/2^+$	D+Q		DCO=0.72 *21*
604.0 *1*	12.1 *18*	3292.30	$(35/2^-)$	2688.30	$(31/2^-)$	Q		DCO=1.07 *15*
612.9 *3*	8.6 *13*	3452.6	$(37/2^-)$	2839.70	$(33/2^-)$	Q		DCO=1.09 *13*
626.0 *1*	20.1 *10*	2635.40	$(29/2^+)$	2009.40	$(25/2^+)$	Q		DCO=1.03 *9*
627.9 *1*	14.8 *22*	4437.1	$(43/2^-)$	3809.2	$(41/2^-)$	D+Q		DCO=0.87 *10*
633.2 *1*	12.2 *18*	2688.30	$(31/2^-)$	2055.10	$(27/2^-)$	Q		DCO=0.95 *21*
649.5 *1*	11.3 *17*	1361.40	$17/2^-$	711.90	$13/2^-$	Q		DCO=1.10 *11*
660.2 *1*	36.4 *18*	2189.40	$29/2^+$	1529.20	$25/2^+$	Q		DCO=0.97 *7*
663.7 *3*	7.5 *11*	2219.3	$(27/2^+)$	1555.6	$23/2^+$	Q		DCO=1.13 *13*
672.0 *1*	22.6 *11*	3292.30	$(35/2^-)$	2620.30	$(31/2^-)$	Q		DCO=1.07 *16*
675.2 *1*	21.5 *11*	2864.6	$33/2^+$	2189.40	$29/2^+$	Q		DCO=1.09 *5*
686.1 *1*	32.9 *16*	1185.20	$19/2^+$	499.10	$17/2^+$	D+Q		DCO=0.45 *5*
699.9 *3*	8.4 *13*	3574.0	$(37/2^-)$	2874.1	$(33/2^-)$	Q		DCO=1.09 *16*
700.4 *5*	1.7 *5*	4647.3	$(45/2^+)$	3946.9	$(41/2^+)$	Q		DCO=1.3 *4*
707.7 *1*	12.9 *19*	1361.40	$17/2^-$	653.70	$15/2^+$	D		DCO=0.72 *10*
707.8 *5*		8843.0		8135.2				
712.2 *3*	4.0 *12*	2931.5	$(31/2^+)$	2219.3	$(27/2^+)$	Q		DCO=1.08 *15*
715.9 *5*	2.7 *8*	4168.5	$(41/2^-)$	3452.6	$(37/2^-)$	Q		DCO=1.3 *3*
717.6 *3*	4.3 *13*	3582.2	$(37/2^+)$	2864.6	$33/2^+$	Q		DCO=1.02 *15*
740.7 *3*	3.3 *10*	1695.60	$(23/2^-)$	954.90	$21/2^+$			
740.9 *5*		7582.4		6841.5	$(57/2^+)$			
759.9 *5*	1.3 *4*	2979.2	$(31/2^+)$	2219.3	$(27/2^+)$	Q		DCO=1.3 *5*
763.4 *5*	2.1 *6*	2818.5		2055.10	$(27/2^-)$			
777.3 *5*		8135.2		7357.9				
788.5 *5*	2.3 *7*	4437.1	$(43/2^-)$	3648.6	$(39/2^-)$	Q		DCO=1.26 *24*
808.2 *5*		3672.8		2864.6	$33/2^+$			
817.1 *5*	1.1 *3*	5464.4	$(49/2^+)$	4647.3	$(45/2^+)$	Q		DCO=1.5 *5*
837.6 *1*	17.6 *26*	4686.1	$(45/2^+)$	3848.5	$(43/2^+)$	D+Q		DCO=0.40 *5*

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^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)

$\gamma(^{189}Pt)$ (continued)

E_γ[‡]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
859.8 *1*	15.0 *23*	4708.3	(47/2$^+$)	3848.5	(43/2$^+$)	Q	DCO=1.03 *10*
862.3 *1*	20 *3*	1361.40	17/2$^-$	499.10	17/2$^+$	D	DCO=1.05 *9*
876.7 *3*	4.5 *14*	3066.1	(33/2$^+$)	2189.40	29/2$^+$	Q	DCO=1.25 *16*
944.8 *5*	1.3 *4*	1443.90	(21/2$^+$)	499.10	17/2$^+$	Q	DCO=1.14 *23*
972.7 *3*	3.1 *9*	6474.7	(57/2$^-$)	5502.0	(53/2$^-$)	Q	DCO=1.2 *3*
986.0 *1*	10.9 *16*	4795.2	(45/2$^-$)	3809.2	(41/2$^-$)	Q	DCO=1.01 *10*
1010.4 *5*	2.9 *9*	2539.6	(27/2$^+$)	1529.20	25/2$^+$	D+Q	DCO=0.48 *11*
1039.4 *3*	6.0 *9*	4848.6	(45/2$^-$)	3809.2	(41/2$^-$)	Q	DCO=1.09 *18*
1054.5 *5*	2.6 *8*	2009.40	(25/2$^+$)	954.90	21/2$^+$	Q	DCO=1.1 *3*
1106.2 *3*	3.5 *11*	2635.40	(29/2$^+$)	1529.20	25/2$^+$	Q	DCO=0.98 *20*
1122.8 *1*	12.7 *19*	6476.4	(55/2$^+$)	5353.6	(53/2$^+$)	D+Q	DCO=0.60 *7*
1200.1 *5*	1.2 *4*	2729.3	(29/2$^+$)	1529.20	25/2$^+$	Q	DCO=1.2 *4*

[†] From DCO ratios and RUL for E2 and M2 when level lifetimes are known. Mult=Q indicated stretched quadrupole (most likely E2); mult=D or D+Q indicates stretched dipole (E1 or M1 with small E2 admixture). For stretched quadrupole transitions, (E2) is assigned here for Eγ<600 keV based on assumed level half-life less than 20 ns (typical coincidence resolving time) and RUL for E2 and M2.

[‡] 2009Hu12 state uncertainty as 0.1-0.5 keV. The evaluators assign as follows: 0.1 keV for Iγ>10, 0.3 keV for Iγ=3-10 and 0.5 keV for Iγ<3.

[#] 2009Hu12 state uncertainty as 5-30%. Evaluators assign as follows: 5% for Iγ>20, 15% for Iγ=5-20 and 30% for Iγ<5.

[@] From BrIcc v2.3b (16-Dec-2014) 2008Ki07, "Frozen Orbitals" appr.

[&] Multiply placed with intensity suitably divided.

^{176}Yb(^{18}O,5nγ) 2009Hu12

Level Scheme

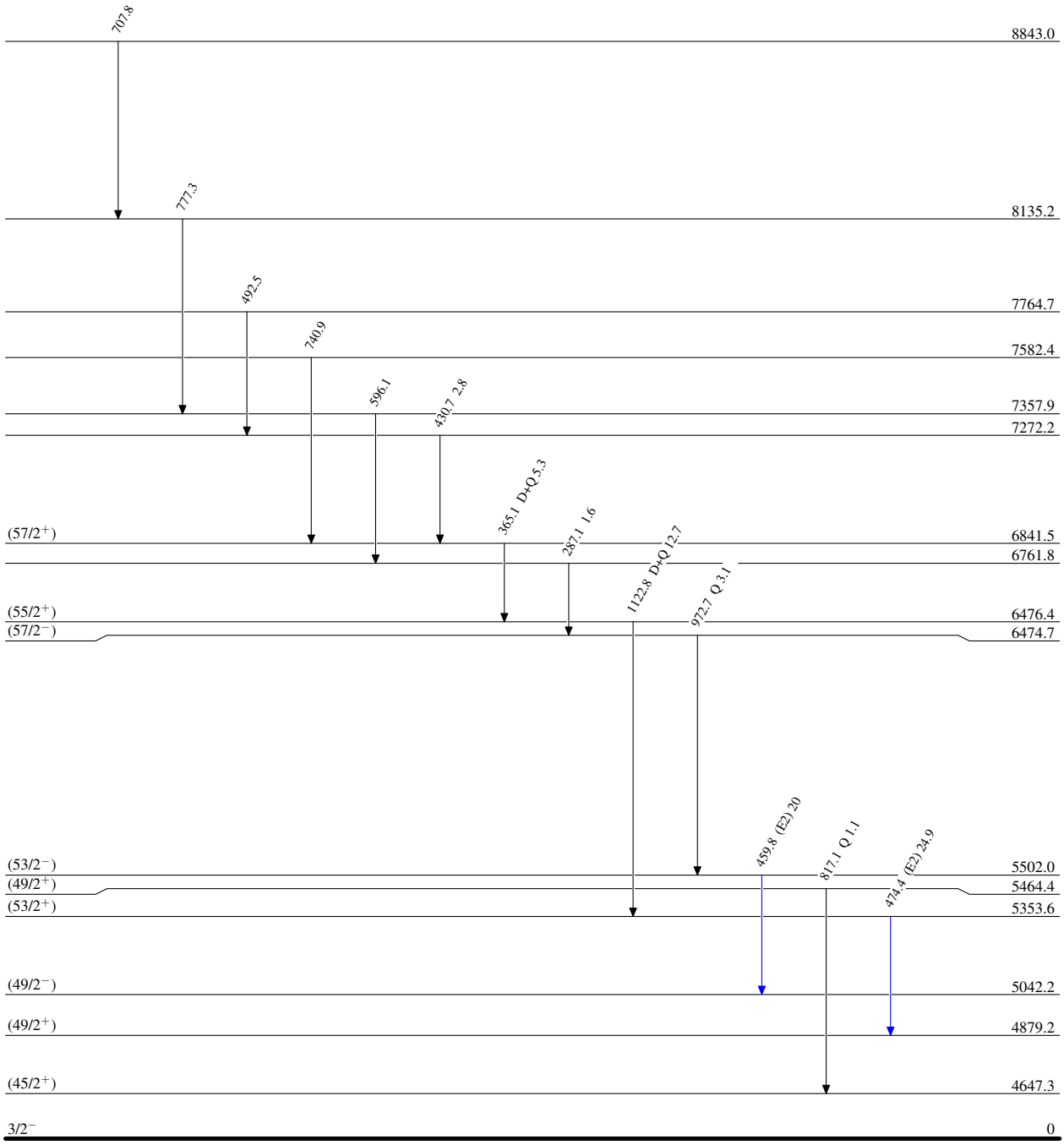
Intensities: Relative I_γ

Legend

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

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

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



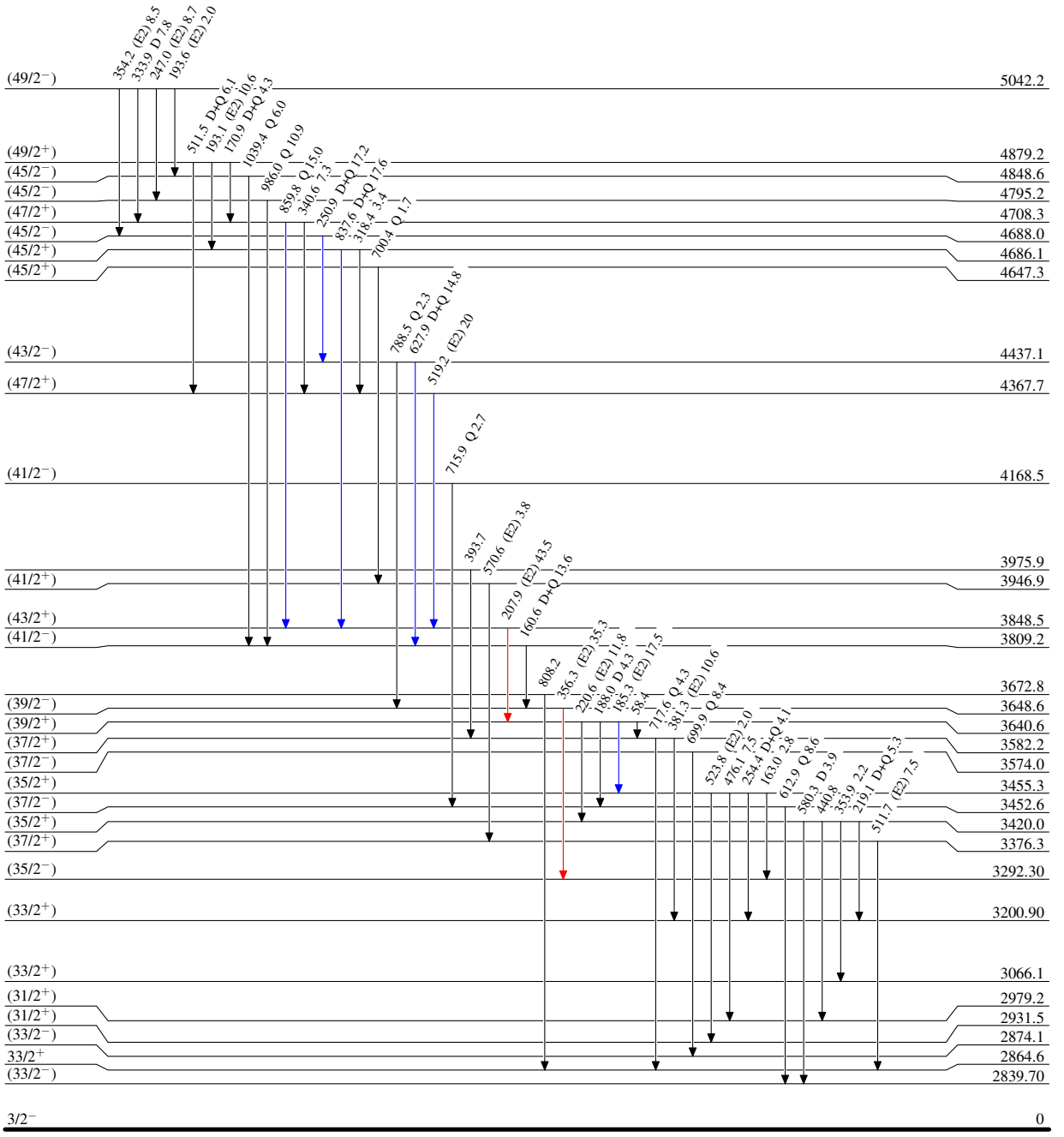
$^{189}_{78}Pt_{111}$

^{176}Yb(^{18}O,5nγ) 2009Hu12

Level Scheme (continued)

Intensities: Relative I_γ

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

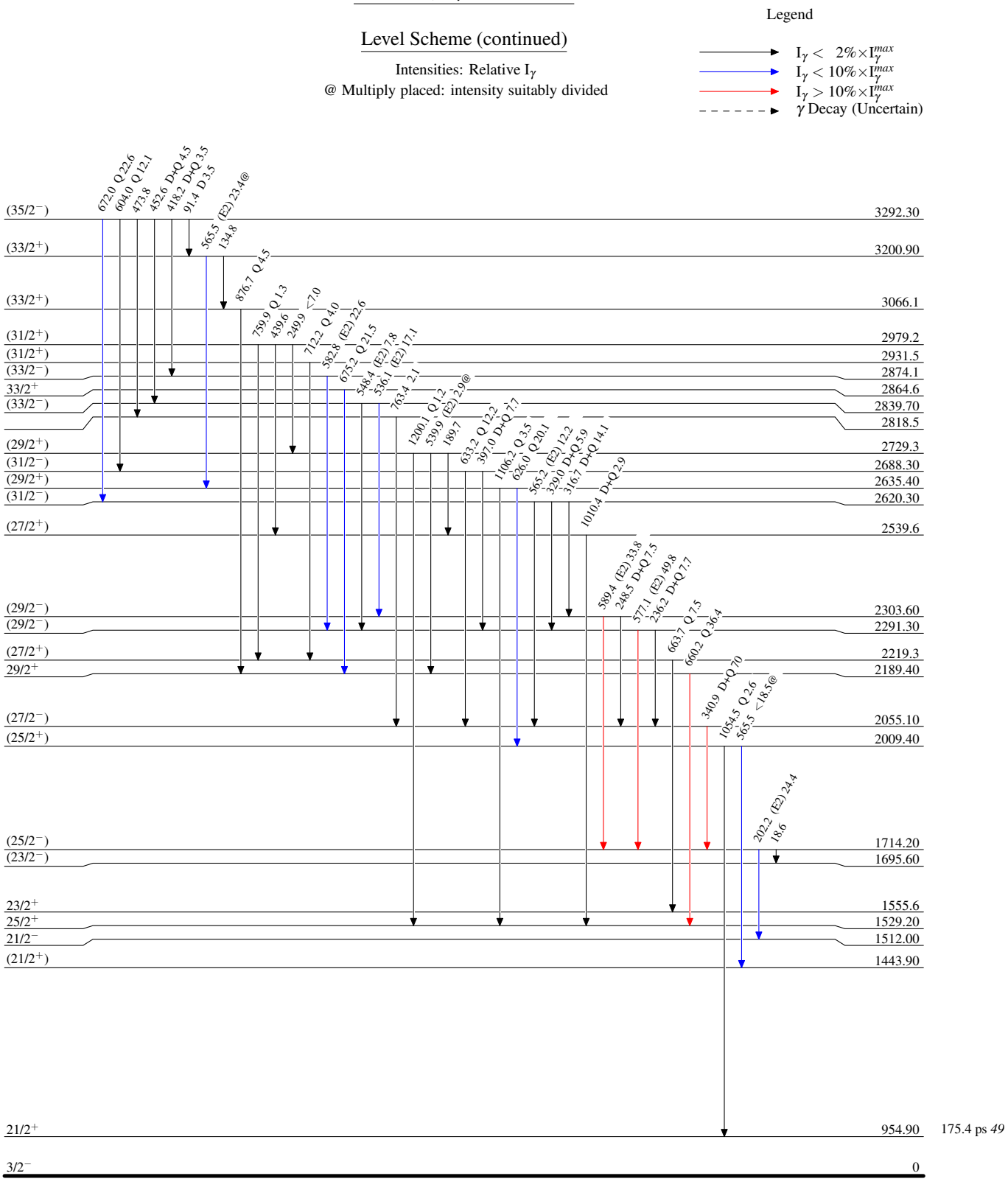


$^{189}_{78}Pt_{111}$

^{176}Yb(^{18}O,5nγ) 2009Hu12

Level Scheme (continued)

Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided



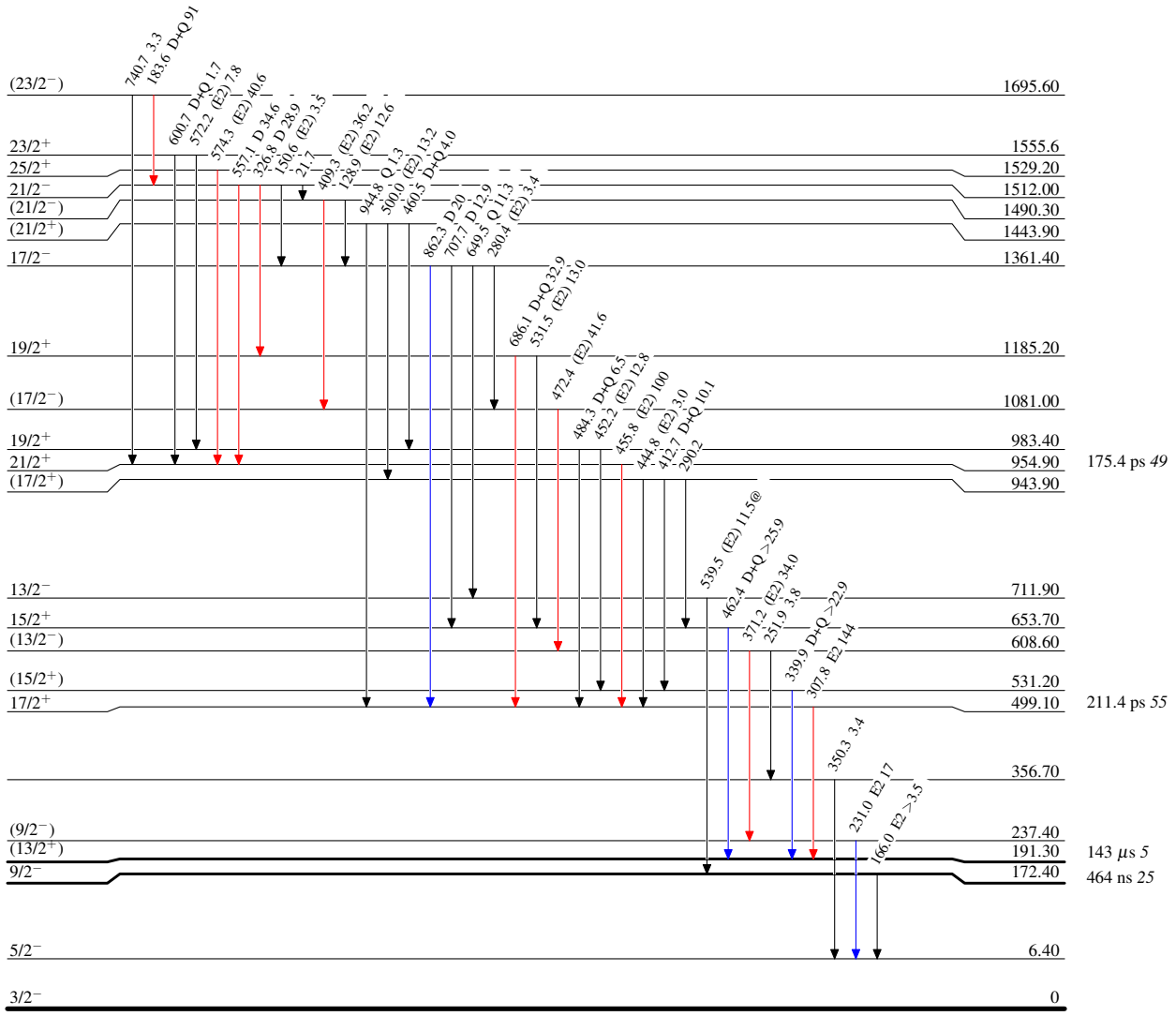
$^{189}_{78}Pt_{111}$

^{176}Yb(^{18}O,5nγ) 2009Hu12

Level Scheme (continued)

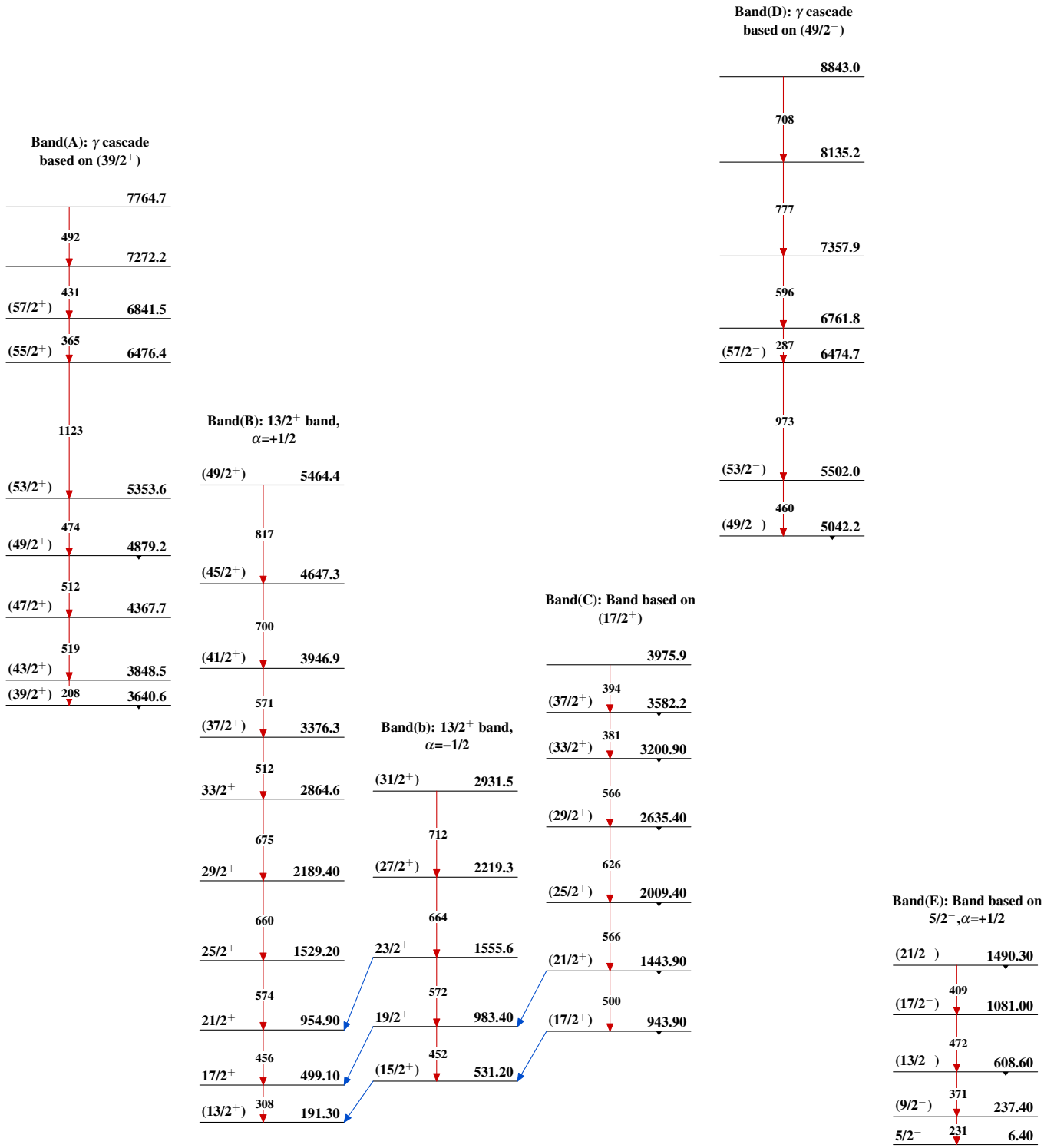
Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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)



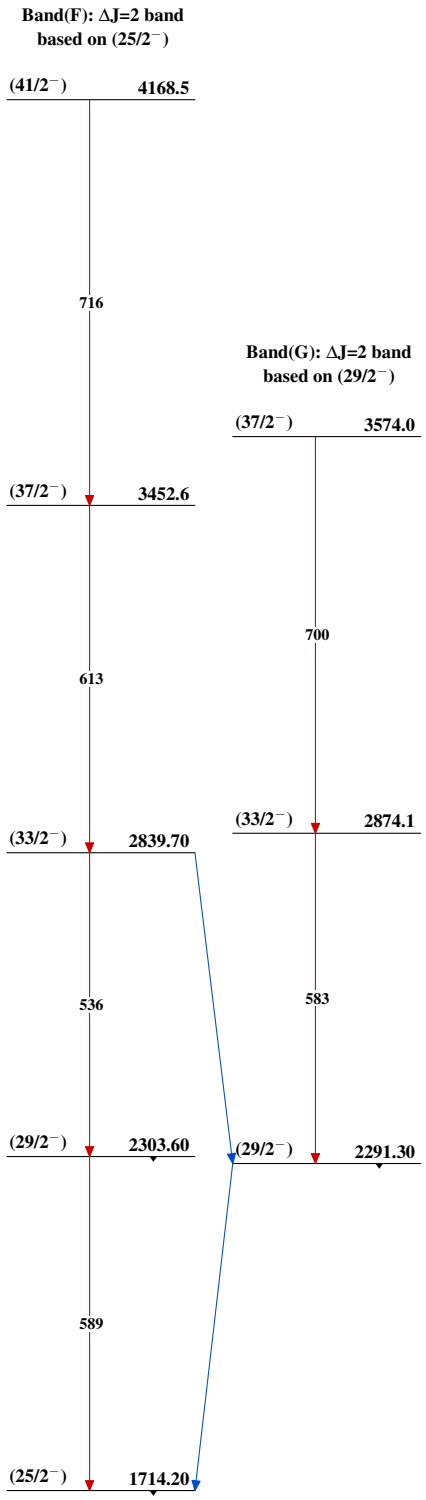
$^{189}_{78}Pt_{111}$

^{176}Yb(^{18}O,5nγ) 2009Hu12



$^{189}_{78}Pt_{111}$

^{176}Yb(^{18}O,5nγ) 2009Hu12 (continued)



$^{189}_{78}Pt_{111}$