^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. C. Batchelder and A. M. Hurst, M. S. Basunia	NDS 183, 1 (2022)	1-Mar-2022

1992Ra34,1992Ra34,2017MaZZ: E=159, 167, and 175 MeV; 92% ^{154}Gd target, 20-detector array of Compton-suppressed Ge detectors, four- Ge-detector Compton polarimeter at 90°; measured Eγ, Iγ, DCO ratios, $\gamma\gamma$ coin, γ polarization, DSA. All three articles describe the same experiment from the same research group.

^{186}Hg Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
0.0[#]	0^+	
405.3[#]	2^+	
522.9[@]	0^+	
620.7[@]	2^+	
807.9[@]	4^+	
1080.5[#]	4^+	
1164.6[@]	6^+	
1228.4[a]	4^+	
1577.6[a]	6^+	
1588.8[@]	8^+	
1677.8[#]	6^+	
1869.1	(5^+)	J$^{\pi}$: Parity from 2017MaZZ (788.6γ M1(+E2) to 4^+).
1906.5[e]	(5)	
1975.4[a]	8^+	
2077.7[@]	10^+	
2155.4[#]	8^+	
2185.2[b]	$7^{(-)}$	
2216.9[c]	(8^-)	
2266.7[e]	(7)	
2393.9[d]	(9^-)	
2427.2[a]	10^+	
2464.4[b]	$9^{(-)}$	
2572.4[e]	(9)	
2591.5[c]	(10^-)	
2619.7[@]	12^+	
2636.2[#]	10^+	
2809.2[d]	(11^-)	
2833.3	10^+	
2847.8[b]	$11^{(-)}$	
2927.2[a]	12^+	
3015.7[e]	(11)	
3048.7[c]	(12^-)	
3088.8[&]	11^-	
3201.3[@]	14^+	
3267.0[b]	$13^{(-)}$	
3304.8[d]	(13^-)	
3470.6[&]	13^-	
3470.9[a]	14^+	
3501.5[e]	(13)	

Continued on next page (footnotes at end of table)

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ (continued)

^{186}Hg Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	Comments
3582.5[c]	(14$^-$)	
3735.0[b]	15$^{(-)}$	
3812.3[@]	16$^+$	
3827.3[&]	15$^-$	
3873.1[d]	(15$^-$)	
4039.2[e]	(15)	
4052.9[a]	16$^+$	
4183.2[c]	(16$^-$)	
4264.9[b]	17$^{(-)}$	
4268.3[&]	17$^-$	
4448.9[@]	18$^+$	
4501.2[d]	(17$^-$)	
4640.9[e]	(17)	
4642.9[a]	18$^+$	
4775.2[&]	19$^-$	
4838.1[b]	19$^{(-)}$	
4838.1[c]	(18$^-$)	
5114.2[@]	20$^+$	
5190.0[d]	(19$^-$)	
5266.6[a]	20$^+$	
5291.4[e]	(19)	
5342.1[&]	21$^-$	
5429.1[b]	20$^{(-)}$	
5814.9[@]	22$^+$	
5962.7[&]	23$^-$	
6071.7[b]	23$^{(-)}$	E(level): 6039 in Adopted Levels, due to placement of 609γ instead of 642.6γ from this level.
6553.8[@]	24$^+$	
6633.5[&]	25$^-$	
7328[@]	(26$^+$)	
7355.8[&]	27$^-$	
8097[&]	(29$^-$)	
8132[@]	(28$^+$)	
8873[&]	(31$^-$)	

[†] From a least-squares fit to Eγ, assuming same uncertainty for all Eγ.
[‡] Author's (1993Ma02) values, based on measured DCO ratios (not listed), γ polarization and deduced band structure.
[#] Band(A): K$^{\pi}$=0$^+$ oblate g.s. band.
[@] Band(B): K$^{\pi}$=0$^+$ prolate band. Average deduced transition Q=7.7 *13* (β_2=0.25 *3*) for band (1993Ma02).
[&] Band(C): π=−, α=1 intruder band. Average deduced transition Q=10.7 *17* (β_2=0.34 *4*) for band (1993Ma02). Possible configuration=(ν 1/2[651])(ν 7/2[514]) and/or (ν 1/2[651])(ν 1/2[770]).
[a] Band(D): ΔJ=2 band.
[b] Band(E): ΔJ=2 band.
[c] Band(F): K$^{\pi}$=(8$^-$), α=0 band.
[d] Band(G): K$^{\pi}$=(8$^-$), α=1 band.
[e] Band(H): ΔJ=2 band possible collective level.

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ (continued)

$\gamma(^{186}Hg)$

E_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α [@]	Comments
177.0	2393.9	(9$^-$)	2216.9	(8$^-$)			
187.2	807.9	4$^+$	620.7	2$^+$			
197.6	2591.5	(10$^-$)	2393.9	(9$^-$)			
215.4	620.7	2$^+$	405.3	2$^+$			
217.7	2809.2	(11$^-$)	2591.5	(10$^-$)			
239.5	3048.7	(12$^-$)	2809.2	(11$^-$)			
241.5	2216.9	(8$^-$)	1975.4	8$^+$			
255.5	3088.8	11$^-$	2833.3	10$^+$	E1	0.0407	Mult.: From DCO ratio=0.60 *5* and linear polarization=+0.40 *28* (1993Ma02).
256.1	3304.8	(13$^-$)	3048.7	(12$^-$)			
277.7	3582.5	(14$^-$)	3304.8	(13$^-$)			
279.2	2464.4	9$^{(-)}$	2185.2	7$^{(-)}$			
290.6	3873.1	(15$^-$)	3582.5	(14$^-$)			
305.7	2572.4	(9)	2266.7	(7)			
310.1	4183.2	(16$^-$)	3873.1	(15$^-$)			
318.0	4501.2	(17$^-$)	4183.2	(16$^-$)			
336.9	4838.1	(18$^-$)	4501.2	(17$^-$)			
349.2	1577.6	6$^+$	1228.4	4$^+$	Q		Mult.: From DCO=1.04 *7* (1992Ra34).
356.7	1164.6	6$^+$	807.9	4$^+$			
356.7	3827.3	15$^-$	3470.6	13$^-$			
360.2	2266.7	(7)	1906.5	(5)			
374.6	2591.5	(10$^-$)	2216.9	(8$^-$)			
381.8	3470.6	13$^-$	3088.8	11$^-$			
383.4	2847.8	11$^{(-)}$	2464.4	9$^{(-)}$			
397.6	2266.7	(7)	1869.1	(5$^+$)			
397.8	1975.4	8$^+$	1577.6	6$^+$	Q[#]		
402.6	807.9	4$^+$	405.3	2$^+$			
405.3	405.3	2$^+$	0.0	0$^+$			
415.3	2809.2	(11$^-$)	2393.9	(9$^-$)			
419.2	3267.0	13$^{(-)}$	2847.8	11$^{(-)}$			
420.6	2847.8	11$^{(-)}$	2427.2	10$^+$			
424.2	1588.8	8$^+$	1164.6	6$^+$			
441.0	4268.3	17$^-$	3827.3	15$^-$			
443.3	3015.7	(11)	2572.4	(9)			
451.8	2427.2	10$^+$	1975.4	8$^+$	Q[#]		
452.6	3088.8	11$^-$	2636.2	10$^+$			
457.2	3048.7	(12$^-$)	2591.5	(10$^-$)			
459.8	1080.5	4$^+$	620.7	2$^+$			
468.0	3735.0	15$^{(-)}$	3267.0	13$^{(-)}$			
477.6	2155.4	8$^+$	1677.8	6$^+$			
480.8	2636.2	10$^+$	2155.4	8$^+$			
485.8	3501.5	(13)	3015.7	(11)			
488.9	2077.7	10$^+$	1588.8	8$^+$			
489.0	2464.4	9$^{(-)}$	1975.4	8$^+$			
495.6	3304.8	(13$^-$)	2809.2	(11$^-$)			
497.1	1577.6	6$^+$	1080.5	4$^+$			
500.0	2927.2	12$^+$	2427.2	10$^+$	Q[#]		
506.9	4775.2	19$^-$	4268.3	17$^-$			
529.9	4264.9	17$^{(-)}$	3735.0	15$^{(-)}$			
533.8	3582.5	(14$^-$)	3048.7	(12$^-$)			
537.7	4039.2	(15)	3501.5	(13)			
542.0	2619.7	12$^+$	2077.7	10$^+$			
543.7	3470.9	14$^+$	2927.2	12$^+$	Q[#]		
566.9	5342.1	21$^-$	4775.2	19$^-$			

Continued on next page (footnotes at end of table)

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ (continued)

$\gamma(^{186}Hg)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
568.3		3873.1	(15^-)	3304.8	(13^-)		
573.2		4838.1	$19^{(-)}$	4264.9	$17^{(-)}$		
581.6		3201.3	14^+	2619.7	12^+		
582.0		4052.9	16^+	3470.9	14^+	Q#	
590.0		4642.9	18^+	4052.9	16^+	Q#	
591.0		5429.1	$20^{(-)}$	4838.1	$19^{(-)}$		
597.3		1677.8	6^+	1080.5	4^+		
600.7		4183.2	(16^-)	3582.5	(14^-)		
601.7		4640.9	(17)	4039.2	(15)		
607.6	3.2	2185.2	$7^{(-)}$	1577.6	6^+	D	Mult.: From DCO=0.71 *17* (1992Ra34).
607.7	2.2	1228.4	4^+	620.7	2^+		
611.0		3812.3	16^+	3201.3	14^+		
620.6	4.3 *2*	5962.7	23^-	5342.1	21^-		
623.7		5266.6	20^+	4642.9	18^+	Q#	
628.1		2216.9	(8^-)	1588.8	8^+		
628.1		4501.2	(17^-)	3873.1	(15^-)		
636.6		4448.9	18^+	3812.3	16^+		
642.6		6071.7	$23^{(-)}$	5429.1	$20^{(-)}$		E_γ: Placement from 6680 keV in Adopted Levels.
650.5		5291.4	(19)	4640.9	(17)		
654.9		4838.1	(18^-)	4183.2	(16^-)		
665.3	6.8 *3*	5114.2	20^+	4448.9	18^+		
670.8	2.0 *2*	6633.5	25^-	5962.7	23^-		
675.2		1080.5	4^+	405.3	2^+		
688.8		5190.0	(19^-)	4501.2	(17^-)		
700.7	4.0 *2*	5814.9	22^+	5114.2	20^+		
722.3	1.1 *1*	7355.8	27^-	6633.5	25^-		
738.9	2.2 *2*	6553.8	24^+	5814.9	22^+		
741		8097	(29^-)	7355.8	27^-		
755.6		2833.3	10^+	2077.7	10^+		
769.7		1577.6	6^+	807.9	4^+	Q	Mult.: From DCO=0.99 *8* (2017MaZZ).
774		7328	(26^+)	6553.8	24^+		
776		8873	(31^-)	8097	(29^-)		
788.6		1869.1	(5^+)	1080.5	4^+	M1(+E2)	Mult.: From conversion electron measurements (2017MaZZ), value not listed.
804		8132	(28^+)	7328	(26^+)		
810.8		1975.4	8^+	1164.6	6^+	Q	Mult.: From DCO=0.97 *9* (1992Ra34), 1.1 10 (2017MaZZ).
826.0		1906.5	(5)	1080.5	4^+		
838.4		2427.2	10^+	1588.8	8^+		
849.5		2927.2	12^+	2077.7	10^+		
1011.1		3088.8	11^-	2077.7	10^+	D	Mult.: From DCO ratio=0.69 *6* (1993Ma02).
1098.6		1906.5	(5)	807.9	4^+		
1244.5		2833.3	10^+	1588.8	8^+		

† From 1993Ma02. Uncertainty not stated by authors.
‡ For E(^{36}S)=167 MeV (1993Ma02).
# 2017MaZZ propose stretched E2 transitions from the measured DCO ratios of ~1.0.
@ Additional information 1.

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ

Level Scheme

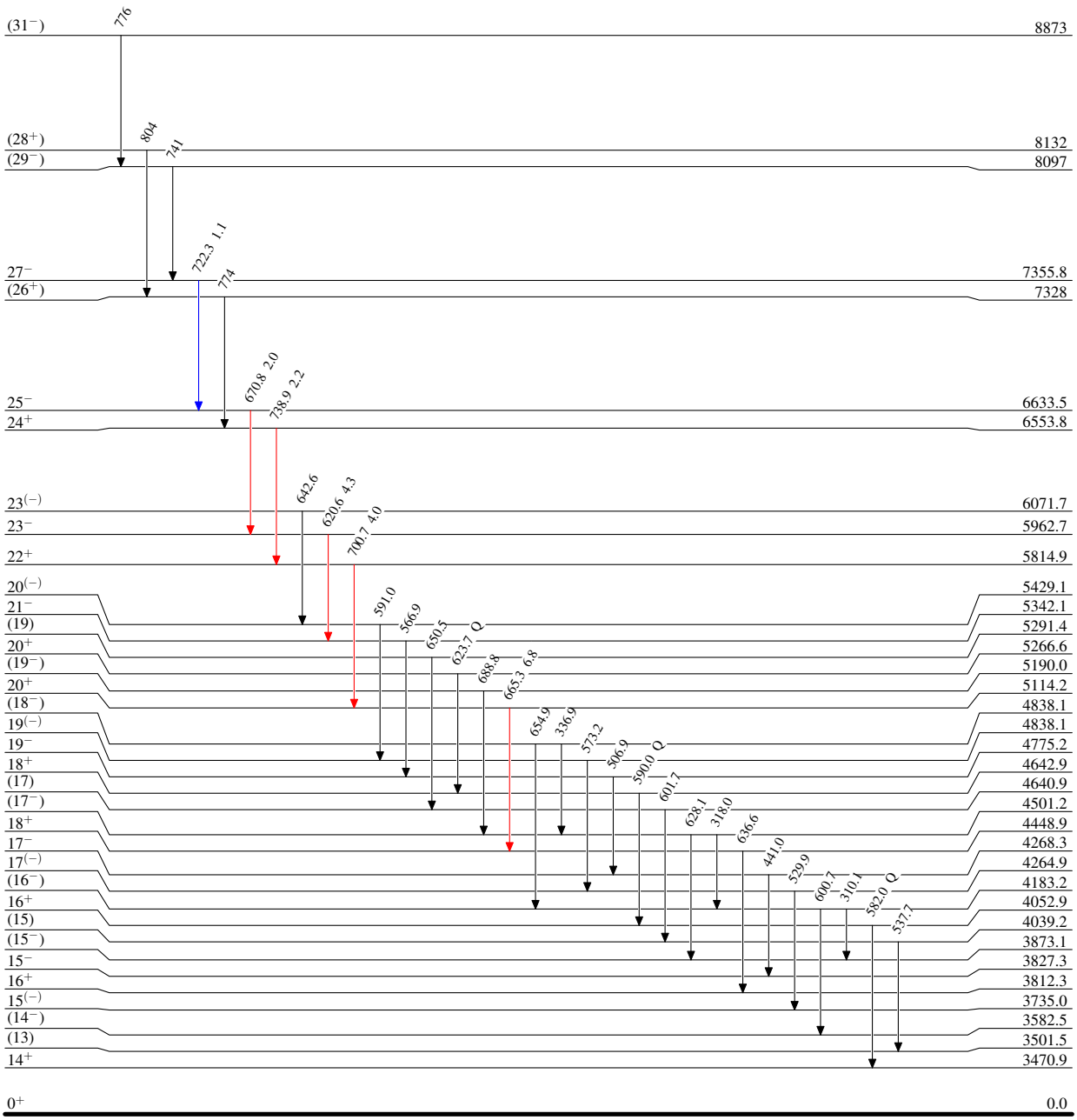
Intensities: Relative I_γ

Legend

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

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

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

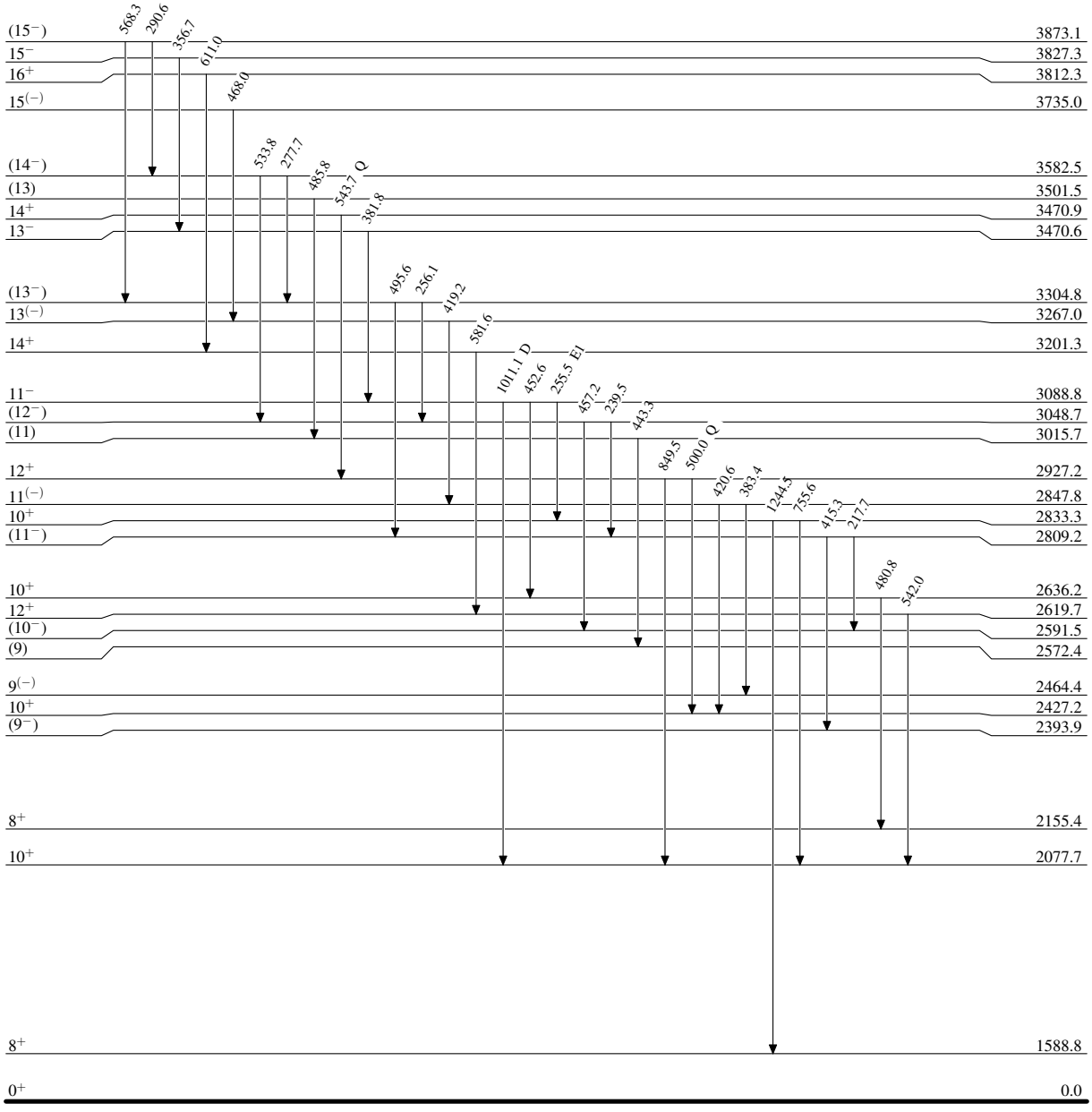


$^{186}_{80}Hg_{106}$

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ

Level Scheme (continued)

Intensities: Relative I_γ



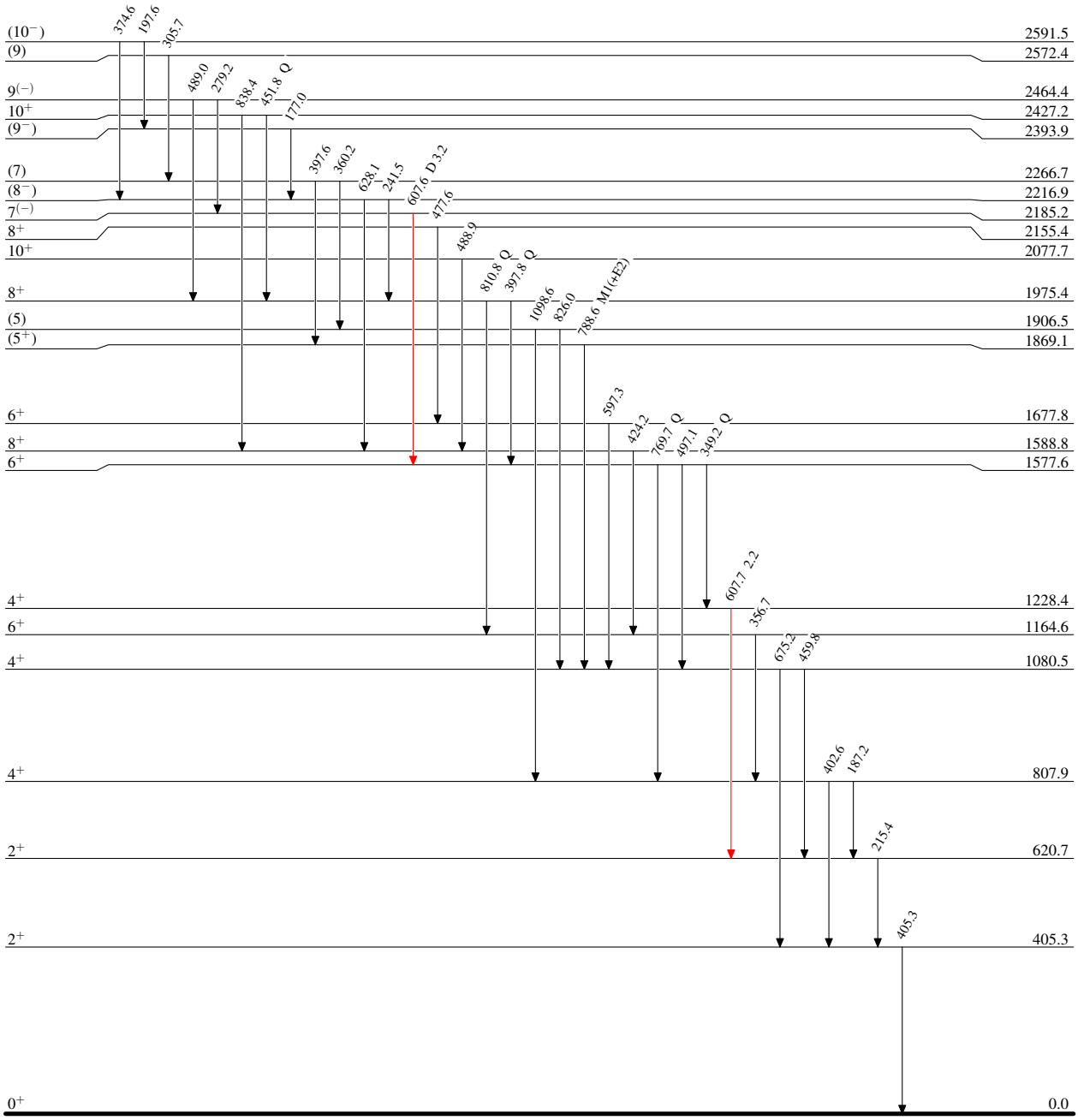
$^{186}_{80}Hg_{106}$

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ

Level Scheme (continued)

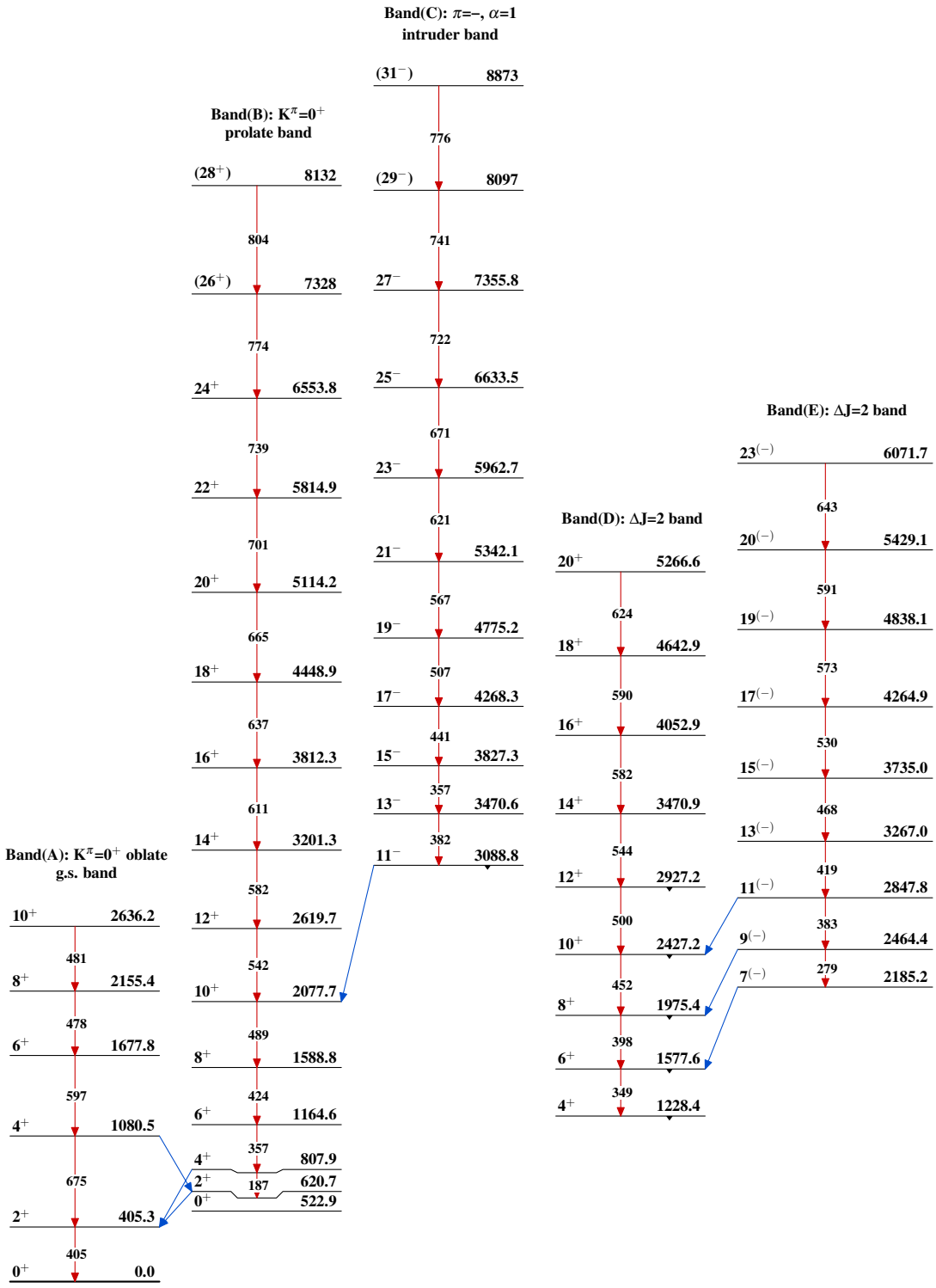
Intensities: Relative I_γ

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



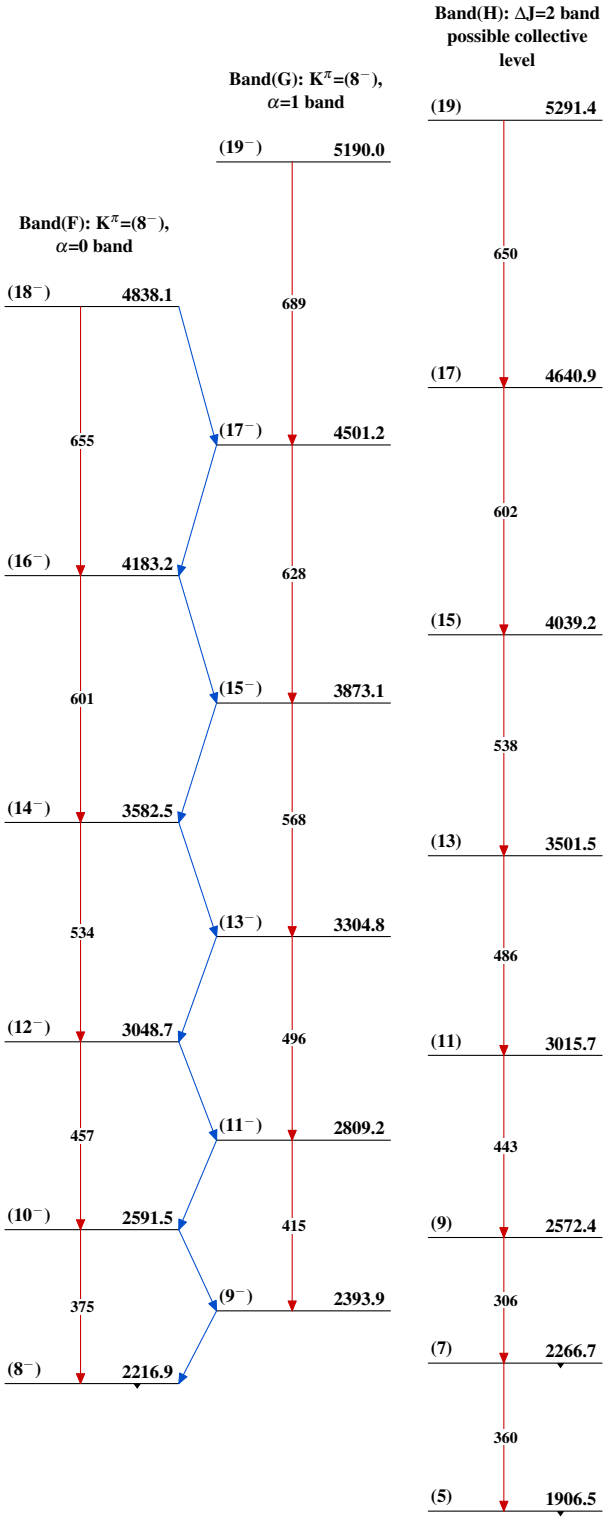
$^{186}_{80}Hg_{106}$

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ



$^{186}_{80}Hg_{106}$

^{154}Gd(^{36}S,4nγ) 1993Ma02,1992Ra34,2017MaZZ (continued)



$^{186}_{80}Hg_{106}$