^{94}Zr(^{74}Ge,5nγ) 2014Ya30

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	31-Dec-2014

2014Ya30: E(^{74}Ge)=330 MeV from ATLAS-ANL facility. Target ≈0.76 mg/cm^2 thick enriched ^{94}Zr. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO) using Gammasphere array with 99 Compton-suppressed Ge detectors. Deduced high-spin levels, J, π, multipolarity, bands, alignments, band crossings, configurations. Comparison with cranked shell-model calculations. Search for triaxial strongly deformed bands (TSD) proved negative.

^{163}Hf Levels

Quasiparticle labels:
A: ν3/2[651],α=+1/2 from $\nu i_{13/2}$ orbital.
B: ν3/2[651],α=−1/2 from $\nu i_{13/2}$ orbital.
C: ν1/2[660],α=+1/2 from $\nu i_{13/2}$ orbital.
D: ν3/2[651],α=−1/2 from $\nu i_{13/2}$ orbital.
E: ν5/2[523],α=+1/2 from $\nu h_{9/2}$ orbital.
F: ν5/2[523],α=−1/2 from $\nu h_{9/2}$ orbital.
G: ν3/2[521],α=+1/2 from $\nu f_{7/2}$ orbital.
H: ν3/2[521],α=−1/2 from $\nu f_{7/2}$ orbital.
a: π5/2[402],α=+1/2 from $\pi d_{5/2}$ orbital.
b: π5/2[402],α=−1/2 from $\pi d_{5/2}$ orbital.
c: π1/2[411],α=+1/2 from $\pi d_{3/2}$ orbital.
d: π1/2[411],α=−1/2 from $\pi d_{3/2}$ orbital.
e: π9/2[514],α=+1/2 from $\pi h_{11/2}$ orbital.
f: π9/2[514],α=−1/2 from $\pi h_{11/2}$ orbital.
g: π1/2[541],α=+1/2 from $\pi h_{9/2}$ orbital.

E(level)[†]	J$^\pi$[‡]	Comments
0.0[&]	5/2$^-$	E(level): lowest level populated in this study is proposed to be the ground state.
107.10[&] 2	9/2$^-$	
150.9[#] 5	13/2$^+$	E(level): this level may be an isomer.
406.3[#] 5	17/2$^+$	
457.4[&] 3	13/2$^-$	
840.8[#] 5	21/2$^+$	
953.5[&] 4	17/2$^-$	
1144.1[@] 4	19/2$^+$	
1150.2[d] 5	17/2$^+$	
1404.6[#] 5	25/2$^+$	
1537.8[&] 4	21/2$^-$	
1549.0[d] 5	21/2$^+$	
1612.6[g] 6	17/2$^+$	
1630.0 4	21/2$^-$	E(level): side structure of ν5/2[523],α=+1/2 band.
1710.3[@] 4	23/2$^+$	
1759.1[f] 5	19/2$^+$	
1933.1[g] 5	21/2$^+$	
1968.7[a] 5	23/2$^-$	
2007.0[d] 5	25/2$^+$	
2019.0[&] 4	25/2$^-$	

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^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

^{163}Hf Levels (continued)

E(level)[†]	J$^{\pi}$[‡]
2063.2[#] 5	29/2$^+$
2138.6[b] 4	25/2$^-$
2139.5[f] 5	23/2$^+$
2224.8[e] 5	25/2$^+$
2322.9[a] 5	27/2$^-$
2325.2[g] 5	25/2$^+$
2488.1[&] 4	29/2$^-$
2492.5[c] 6	27/2$^-$
2542.8[d] 5	29/2$^+$
2555.9[b] 4	29/2$^-$
2615.4[f] 5	27/2$^+$
2664.1[a] 5	31/2$^-$
2749.3[e] 5	29/2$^+$
2792.9[#] 5	33/2$^+$
2878.2[g] 6	29/2$^+$
2915.7[c] 5	31/2$^-$
2920.6[&] 5	33/2$^-$
3092.8[b] 5	33/2$^-$
3133.2[a] 5	35/2$^-$
3142.9[d] 6	33/2$^+$
3220.8[f] 6	31/2$^+$
3321.4[e] 5	33/2$^+$
3433.9[&] 5	37/2$^-$
3442.9[c] 5	35/2$^-$
3556.4[#] 5	37/2$^+$
3566.8[g] 6	33/2$^+$
3683.0[b] 5	37/2$^-$
3733.6[a] 5	39/2$^-$
3795.9[d] 6	37/2$^+$
3856.3[h] 6	35/2$^{(-)}$
3936.8[e] 5	37/2$^+$
3941.4[f] 8	35/2$^+$
4053.2[&] 5	41/2$^-$
4054.8[c] 5	39/2$^-$
4271.1[#] 5	41/2$^+$
4329.2[b] 5	41/2$^-$
4370.4[g] 8	37/2$^+$
4407.9[h] 6	39/2$^{(-)}$
4442.7[a] 5	43/2$^-$
4536.0[d] 6	41/2$^+$
4633.6[e] 5	41/2$^+$
4719.7[f] 9	39/2$^+$
4753.4[c] 6	43/2$^-$
4781.7[&] 6	45/2$^-$
4964.2[#] 6	45/2$^+$
5000.4[h] 8	43/2$^{(-)}$
5092.6[b] 5	45/2$^-$

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^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

^{163}Hf Levels (continued)

E(level)[†]	Jπ[‡]	Comments
5104.4[g] 9	41/2+	
5206.5 9		E(level): side structure of band AEH.
5231.6[a] 6	47/2−	
5291.5[d] 6	45/2+	
5335.6 8	(45/2+)	E(level): side structure of Gamma-vibrational band.
5495.2[c] 7	47/2−	
5597.4[&] 6	49/2−	
5668.2[h] 10	47/2(−)	
5705.0[#] 6	49/2+	
5888.1[b] 7	49/2−	
5989.0 8	(49/2−)	E(level): side structure of band GAB.
6011.1[d] 7	49/2+	
6096.0[a] 6	51/2−	
6257.8[c] 7	51/2−	
6380.4[h] 11	51/2(−)	
6484.6[&] 6	53/2−	
6510.9[#] 6	53/2+	
6593.6[b] 6	53/2−	
6985.3[a] 6	55/2−	
7058.8 6	55/2−	E(level): side structure of band FAB.
7155.6[h] 12	55/2(−)	
7314.4[&] 6	57/2−	
7385.0[#] 7	57/2+	
7452.6 8	(57/2−)	E(level): side structure of ν5/2[523],α=+1/2 band.
7812.3[a] 6	59/2−	
7998.3[h] 13	59/2(−)	
8036.1 8	(59/2−)	E(level): side structure of band FAB.
8133.6[&] 8	61/2−	
8322.2[#] 7	61/2+	
8360.0 9	(61/2+)	E(level): side structure of ν3/2[651],α=+1/2 band.
8450.6 8	(61/2−)	E(level): side structure of ν5/2[523],α=+1/2 band.
8690.3[a] 8	63/2−	
8903.1[h] 14	63/2(−)	
9018.4[&] 10	65/2−	
9171.5[#] 9	65/2+	
9326.0 9	(65/2+)	E(level): side structure of ν3/2[651],α=+1/2 band.
9623.1[a] 10	67/2−	
9979.6[&] 11	69/2−	
10050.7[#] 10	69/2+	
10609.3[a] 11	71/2−	
10986.4[#] 11	73/2+	
11011.5[&] 12	73/2−	
11972.4[#] 12	77/2+	

[†] From least-squares fit to Eγ data.
[‡] From multipolarities deduced from DCO ratios and band structures in the present work.

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^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

^{163}Hf Levels (continued)

[#] Band(A): ν3/2[651],α=+1/2. Configuration=A –>ABC –>ABCfg. First band crossing at $\hbar\omega$=0.36 MeV, second at 0.45 MeV.
[@] Band(a): ν3/2[651],α=−1/2.
[&] Band(B): ν5/2[523],α=+1/2. Configuration=E –>EAB –>EABfg. First band crossing at $\hbar\omega$=0.24 MeV, second at 0.43 MeV.
[a] Band(C): 3-qp, FAB band,α=−1/2. Configuration=FAB –>FABfg. Band crossing at $\hbar\omega$=0.43 MeV.
[b] Band(D): 3-qp GAB band,α=+1/2.
[c] Band(d): 3-qp, HAB band,α=−1/2.
[d] Band(E): Gamma-vibrational band. Configuration=γ –>$\gamma\otimes$BC. Band crossing at $\hbar\omega$=0.36 MeV.
[e] Band(F): Gamma-vibrational band.
[f] Band(G): 3-qp, AEG band, α=−1/2.
[g] Band(g): 3-qp, AEH Band, α=+1/2 Configuration=AEH –>AEHBC. Band crossing at $\hbar\omega$=0.37 MeV.
[h] Band(H): 5-qp, ABCfb band.

γ(^{163}Hf)

DCO ratios corresponds to gates on stretched quadrupole transitions unless otherwise indicated. Expected values are 1.0 for stretched quadrupoles and 0.6 for stretched dipoles.

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	Comments
107.1 *2*	5.6 *9*	107.10	9/2$^-$	0.0	5/2$^-$	(E2)	2.70 *5*	DCO=0.95 *13*
176.0 *5*	<0.5	2664.1	31/2$^-$	2488.1	29/2$^-$			
212.6 *5*	<0.5	3133.2	35/2$^-$	2920.6	33/2$^-$			
255.4 *2*	61 *2*	406.3	17/2$^+$	150.9	13/2$^+$	(E2)	0.1299	DCO=0.91 *9*
299.7 *5*	<0.5	3733.6	39/2$^-$	3433.9	37/2$^-$			
303.3 *2*	2.1 *3*	1144.1	19/2$^+$	840.8	21/2$^+$	D		DCO=1.03 *16* DCO ratio from gate at stretched dipole transition.
303.9 *5*	0.53 *9*	2322.9	27/2$^-$	2019.0	25/2$^-$	D		DCO=0.63 *13*
305.7 *5*	0.57 *9*	1710.3	23/2$^+$	1404.6	25/2$^+$	D		DCO=0.95 *28* DCO ratio from gate at stretched dipole transition.
308.7 *2*	11 *1*	2019.0	25/2$^-$	1710.3	23/2$^+$	D		DCO=0.56 *6*
318.2 *5*	0.5 *1*	2325.2	25/2$^+$	2007.0	25/2$^+$	D[#]		DCO=0.97 *29*
320.5 *5*	0.5 *1*	1933.1	21/2$^+$	1612.6	17/2$^+$			
341.3 *2*	15 *2*	2664.1	31/2$^-$	2322.9	27/2$^-$	(E2)	0.0542	DCO=0.94 *14*
349.5 *2*	4.5 *7*	2488.1	29/2$^-$	2138.6	25/2$^-$			
350.3 *2*	48 *5*	457.4	13/2$^-$	107.10	9/2$^-$	(E2)	0.0503	DCO=0.97 *12*
354.2 *2*	3.1 *5*	2322.9	27/2$^-$	1968.7	23/2$^-$	(E2)		DCO=0.98 *13*
364.7 *2*	3.3 *5*	2920.6	33/2$^-$	2555.9	29/2$^-$	(E2)		DCO=0.96 *14*
380.4 *5*	0.89 *15*	2139.5	23/2$^+$	1759.1	19/2$^+$	(E2)		DCO=0.93 *14*
384.1 *5*	0.6 *1*	1933.1	21/2$^+$	1549.0	21/2$^+$	D[#]		DCO=0.98 *20*
389.0 *2*	12 *2*	2019.0	25/2$^-$	1630.0	21/2$^-$	(E2)		DCO=0.91 *14*
392.1 *2*	2.5 *4*	2325.2	25/2$^+$	1933.1	21/2$^+$	(E2)		DCO=0.92 *15*
398.8 *2*	1.8 *3*	1549.0	21/2$^+$	1150.2	17/2$^+$	(E2)		DCO=0.90 *13*
417.3 *2*	2.6 *6*	2555.9	29/2$^-$	2138.6	25/2$^-$	Q		DCO=1.11 *19*
423.2 *5*	0.57 *12*	2915.7	31/2$^-$	2492.5	27/2$^-$			
427.6 *5*	<0.5	2915.7	31/2$^-$	2488.1	29/2$^-$			
428.7 *5*	<0.5	3092.8	33/2$^-$	2664.1	31/2$^-$			
432.5 *2*	11 *2*	2920.6	33/2$^-$	2488.1	29/2$^-$	(E2)		DCO=1.13 *14*
434.5 *2*	100 *3*	840.8	21/2$^+$	406.3	17/2$^+$	(E2)		DCO=0.93 *10*
458.0 *2*	1.5 *2*	2007.0	25/2$^+$	1549.0	21/2$^+$	(E2)		DCO=1.06 *16*
462.4 *5*	<0.5	1612.6	17/2$^+$	1150.2	17/2$^+$	D[#]		DCO=0.93 *19*
469.1 *2*	15 *2*	2488.1	29/2$^-$	2019.0	25/2$^-$	(E2)		DCO=1.02 *14*
469.1 *2*	14 *2*	3133.2	35/2$^-$	2664.1	31/2$^-$	(E2)		DCO=0.94 *12*

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^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

γ(^{163}Hf) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
475.9 *2*	2.9 *4*	2615.4	27/2$^+$	2139.5	23/2$^+$	(E2)	DCO=1.07 *17*
481.2 *2*	19 *2*	2019.0	25/2$^-$	1537.8	21/2$^-$	(E2)	DCO=1.05 *14*
485.9 *2*	16 *2*	1630.0	21/2$^-$	1144.1	19/2$^+$	D	DCO=0.63 *8*
496.1 *2*	37 *4*	953.5	17/2$^-$	457.4	13/2$^-$	(E2)	DCO=0.90 *14*
513.3 *2*	10 *1*	3433.9	37/2$^-$	2920.6	33/2$^-$	Q	DCO=0.95 *10*
524.5 *2*	1.9 *3*	2749.3	29/2$^+$	2224.8	25/2$^+$		
527.2 *2*	2.8 *5*	3442.9	35/2$^-$	2915.7	31/2$^-$	Q	DCO=1.14 *18*
535.8 *2*	2.7 *3*	2542.8	29/2$^+$	2007.0	25/2$^+$	Q	DCO=1.08 *16*
536.9 *2*	5.2 *8*	2555.9	29/2$^-$	2019.0	25/2$^-$	Q	DCO=0.98 *10*
536.9 *2*	8.6 *9*	3092.8	33/2$^-$	2555.9	29/2$^-$	Q	DCO=1.08 *14*
549.8 *2*	1.4 *2*	3683.0	37/2$^-$	3133.2	35/2$^-$	D	DCO=0.55 *9*
551.6 *5*	0.6 *1*	4407.9	39/2$^{(-)}$	3856.3	35/2$^{(-)}$	Q	DCO=1.1 *2*
553.0 *2*	2.4 *4*	2878.2	29/2$^+$	2325.2	25/2$^+$	Q	DCO=0.97 *9*
563.7 *2*	79 *3*	1404.6	25/2$^+$	840.8	21/2$^+$	Q	DCO=0.96 *11*
566.2 *2*	3.1 *5*	1710.3	23/2$^+$	1144.1	19/2$^+$		
572.1 *2*	1.5 *3*	3321.4	33/2$^+$	2749.3	29/2$^+$	Q	DCO=0.98 *15*
584.3 *2*	24 *3*	1537.8	21/2$^-$	953.5	17/2$^-$	Q	DCO=1.02 *13*
590.2 *2*	5.0 *8*	3683.0	37/2$^-$	3092.8	33/2$^-$	Q	DCO=1.04 *15*
590.5 *5*	0.89 *15*	2139.5	23/2$^+$	1549.0	21/2$^+$	D	DCO=0.64 *10*
592.5 *5*	0.5 *1*	5000.4	43/2$^{(-)}$	4407.9	39/2$^{(-)}$	Q	DCO=1.03 *15*
592.8 *2*	1.4 *2*	2915.7	31/2$^-$	2322.9	27/2$^-$	Q	DCO=0.97 *13*
600.1 *5*	0.85 *15*	3142.9	33/2$^+$	2542.8	29/2$^+$	Q	DCO=1.16 *18*
600.4 *2*	12.2 *9*	3733.6	39/2$^-$	3133.2	35/2$^-$	Q	DCO=0.89 *16*
600.8 *2*	9 *1*	2138.6	25/2$^-$	1537.8	21/2$^-$	Q	DCO=1.06 *15*
600.9 *2*	4.8 *8*	2664.1	31/2$^-$	2063.2	29/2$^+$		
602.4 *5*	0.93 *15*	2007.0	25/2$^+$	1404.6	25/2$^+$		
604.7 *2*	2.7 *4*	3092.8	33/2$^-$	2488.1	29/2$^-$	Q	DCO=1.04 *17*
605.4 *2*	1.8 *3*	3220.8	31/2$^+$	2615.4	27/2$^+$	Q	DCO=0.91 *14*
611.9 *2*	1.8 *3*	4054.8	39/2$^-$	3442.9	35/2$^-$	Q	DCO=0.97 *13*
614.9 *5*	0.8 *2*	2325.2	25/2$^+$	1710.3	23/2$^+$		
615.0 *5*	0.72 *13*	1759.1	19/2$^+$	1144.1	19/2$^+$		
615.4 *2*	3.3 *5*	3936.8	37/2$^+$	3321.4	33/2$^+$	Q	DCO=0.96 *13*
619.3 *2*	8.7 *9*	4053.2	41/2$^-$	3433.9	37/2$^-$	Q	DCO=0.98 *11*
646.2 *2*	2.9 *4*	4329.2	41/2$^-$	3683.0	37/2$^-$	Q	DCO=1.08 *11*
650.0 *2*	1.4 *2*	3442.9	35/2$^-$	2792.9	33/2$^+$		
653.0 *5*	0.62 *9*	3795.9	37/2$^+$	3142.9	33/2$^+$		
658.6 *2*	47 *2*	2063.2	29/2$^+$	1404.6	25/2$^+$	Q	DCO=0.96 *12*
667.8 *5*	<0.5	5668.2	47/2$^{(-)}$	5000.4	43/2$^{(-)}$	Q	DCO=1.02 *12*
676.5 *2*	11 *2*	1630.0	21/2$^-$	953.5	17/2$^-$	Q	DCO=1.07 *16*
686.1 *5*	0.8 *2*	2749.3	29/2$^+$	2063.2	29/2$^+$		
688.6 *2*	1.8 *3*	3566.8	33/2$^+$	2878.2	29/2$^+$	Q	DCO=0.94 *14*
693.1 *2*	8.3 *9*	4964.2	45/2$^+$	4271.1	41/2$^+$	Q	DCO=0.92 *13*
696.8 *2*	2.5 *4*	4633.6	41/2$^+$	3936.8	37/2$^+$	Q	DCO=0.97 *14*
698.6 *5*	0.67 *13*	4753.4	43/2$^-$	4054.8	39/2$^-$	Q	DCO=1.12 *18*
705.5 *5*	0.5 *1*	6593.6	53/2$^-$	5888.1	49/2$^-$	Q	DCO=0.92 *13*
708.2 *2*	2.0 *3*	1549.0	21/2$^+$	840.8	21/2$^+$		
709.1 *2*	10.5 *9*	4442.7	43/2$^-$	3733.6	39/2$^-$	Q	DCO=0.92 *13*
712.2 *5*	<0.5	6380.4	51/2$^{(-)}$	5668.2	47/2$^{(-)}$		
714.7 *2*	13 *2*	4271.1	41/2$^+$	3556.4	37/2$^+$	Q	DCO=0.94 *14*
719.6 *5*	<0.5	6011.1	49/2$^+$	5291.5	45/2$^+$		
720.6 *5*	0.9 *2*	3941.4	35/2$^+$	3220.8	31/2$^+$	Q	DCO=1.09 *15*
720.8 *5*	0.5 *1*	7314.4	57/2$^-$	6593.6	53/2$^-$	Q	DCO=0.94 *17*
727.5 *5*	0.54 *9*	6985.3	55/2$^-$	6257.8	51/2$^-$		
728.5 *2*	6.5 *9*	4781.7	45/2$^-$	4053.2	41/2$^-$	Q	DCO=0.95 *12*
729.7 *2*	34 *2*	2792.9	33/2$^+$	2063.2	29/2$^+$	Q	DCO=0.99 *13*

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^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

γ(^{163}Hf) (continued)

E_γ †	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	Comments
734.0 5	<0.5	5104.4	41/2$^+$	4370.4	37/2$^+$		
734.9 5	0.54 8	2139.5	23/2$^+$	1404.6	25/2$^+$		
737.8 2	9 1	1144.1	19/2$^+$	406.3	17/2$^+$	Q	DCO=1.3 2
740.1 5	0.5 1	4536.0	41/2$^+$	3795.9	37/2$^+$		
740.8 2	5.8 7	5705.0	49/2$^+$	4964.2	45/2$^+$	Q	DCO=0.92 13
741.8 2	1.9 3	5495.2	47/2$^-$	4753.4	43/2$^-$	Q	DCO=0.90 17
743.9 5	0.9 2	1150.2	17/2$^+$	406.3	17/2$^+$		
755.5 5	<0.5	5291.5	45/2$^+$	4536.0	41/2$^+$		
762.6 2	2.3 4	6257.8	51/2$^-$	5495.2	47/2$^-$	Q	DCO=0.89 17
763.4 2	3.3 6	5092.6	45/2$^-$	4329.2	41/2$^-$	Q	DCO=1.04 16
763.5 2	23 2	3556.4	37/2$^+$	2792.9	33/2$^+$	Q	DCO=1.07 15
775.2 5	<0.5	7155.6	55/2$^{(-)}$	6380.4	51/2$^{(-)}$	Q	DCO=0.98 16
778.3 5	<0.5	4719.7	39/2$^+$	3941.4	35/2$^+$	Q	DCO=1.06 16
788.9 2	8.3 8	5231.6	47/2$^-$	4442.7	43/2$^-$	Q	DCO=0.92 13
795.5 5	0.95 15	5888.1	49/2$^-$	5092.6	45/2$^-$	Q	DCO=0.95 13
799.6 5	<0.5	5335.6	(45/2$^+$)	4536.0	41/2$^+$		
803.6 5	0.9 2	4370.4	37/2$^+$	3566.8	33/2$^+$		
805.9 2	4.1 5	6510.9	53/2$^+$	5705.0	49/2$^+$	Q	DCO=1.11 19
815.7 2	4.7 8	5597.4	49/2$^-$	4781.7	45/2$^-$	Q	DCO=1.05 12
819.2 5	0.84 16	8133.6	61/2$^-$	7314.4	57/2$^-$		
827.0 2	1.2 2	7812.3	59/2$^-$	6985.3	55/2$^-$	Q	DCO=1.09 15
829.8 2	1.3 2	7314.4	57/2$^-$	6484.6	53/2$^-$	Q	DCO=0.97 12
836.1 5	<0.5	5206.5		4370.4	37/2$^+$		
842.7 5	<0.5	7998.3	59/2$^{(-)}$	7155.6	55/2$^{(-)}$	Q	DCO=0.90 14
849.3 5	0.5 1	9171.5	65/2$^+$	8322.2	61/2$^+$		
852.5 2	2.3 4	2915.7	31/2$^-$	2063.2	29/2$^+$	D	DCO=0.56 11
864.4 2	5.1 8	6096.0	51/2$^-$	5231.6	47/2$^-$	Q	DCO=1.07 12
869.4 2	4.3 9	1710.3	23/2$^+$	840.8	21/2$^+$	Q	DCO=1.3 2
874.1 2	3.4 5	7385.0	57/2$^+$	6510.9	53/2$^+$	Q	DCO=1.14 18
878.0 5	0.76 13	8690.3	63/2$^-$	7812.3	59/2$^-$	Q	DCO=0.94 14
879.2 5	<0.5	10050.7	69/2$^+$	9171.5	65/2$^+$		
884.8 5	0.5 1	9018.4	65/2$^-$	8133.6	61/2$^-$	Q	DCO=1.07 17
887.2 2	3.2 5	6484.6	53/2$^-$	5597.4	49/2$^-$	Q	DCO=0.94 13
889.3 2	2.0 3	6985.3	55/2$^-$	6096.0	51/2$^-$	Q	DCO=1.02 15
896.4 5	<0.5	5989.0	(49/2$^-$)	5092.6	45/2$^-$		
904.8 5	<0.5	8903.1	63/2$^{(-)}$	7998.3	59/2$^{(-)}$		
918.3 2	1.05 19	1759.1	19/2$^+$	840.8	21/2$^+$		
918.3 2	17 2	2322.9	27/2$^-$	1404.6	25/2$^+$	D	DCO=0.65 11
932.8 5	0.5 1	9623.1	67/2$^-$	8690.3	63/2$^-$	Q	DCO=1.08 16
935.7 5	<0.5	10986.4	73/2$^+$	10050.7	69/2$^+$		
937.2 2	1.74 28	8322.2	61/2$^+$	7385.0	57/2$^+$	Q	DCO=1.06 15
961.2 5	<0.5	9979.6	69/2$^-$	9018.4	65/2$^-$	Q	DCO=1.09 18
962.8 2	1.4 2	7058.8	55/2$^-$	6096.0	51/2$^-$	Q	DCO=1.09 16
968.0 5	<0.5	7452.6	(57/2$^-$)	6484.6	53/2$^-$		
974.0 5	<0.5	4407.9	39/2$^{(-)}$	3433.9	37/2$^-$		
975.0 5	<0.5	8360.0	(61/2$^+$)	7385.0	57/2$^+$		
977.3 5	0.63 2	8036.1	(59/2$^-$)	7058.8	55/2$^-$		
979.6 5	0.5 1	4536.0	41/2$^+$	3556.4	37/2$^+$		
986.0 5	<0.5	11972.4	77/2$^+$	10986.4	73/2$^+$		
986.2 5	<0.5	10609.3	71/2$^-$	9623.1	67/2$^-$		
996.2 5	0.7 1	6593.6	53/2$^-$	5597.4	49/2$^-$		
998.0 2	1.2 2	8450.6	(61/2$^-$)	7452.6	(57/2$^-$)	Q	DCO=1.05 16
1003.0 5	<0.5	3795.9	37/2$^+$	2792.9	33/2$^+$		
1003.8 5	<0.5	9326.0	(65/2$^+$)	8322.2	61/2$^+$		
1020.4 5	0.74 12	5291.5	45/2$^+$	4271.1	41/2$^+$		

Continued on next page (footnotes at end of table)

^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)

γ(^{163}Hf) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
1031.9 *5*	<0.5	11011.5	73/2$^-$	9979.6	69/2$^-$		
1046.9 *5*	<0.5	6011.1	49/2$^+$	4964.2	45/2$^+$		
1063.4 *5*	0.66 *9*	3856.3	35/2$^{(-)}$	2792.9	33/2$^+$	D	DCO=0.63 *18*
1077.2 *2*	1.5 *3*	4633.6	41/2$^+$	3556.4	37/2$^+$		
1079.7 *5*	<0.5	3142.9	33/2$^+$	2063.2	29/2$^+$		
1087.9 *5*	0.84 *16*	2492.5	27/2$^-$	1404.6	25/2$^+$		
1092.3 *5*	<0.5	1933.1	21/2$^+$	840.8	21/2$^+$		
1127.9 *2*	2.8 *4*	1968.7	23/2$^-$	840.8	21/2$^+$	D	DCO=0.61 *9*
1138.2 *2*	1.6 *3*	2542.8	29/2$^+$	1404.6	25/2$^+$	Q	DCO=1.04 *15*
1142.7 *2*	2.7 *3*	1549.0	21/2$^+$	406.3	17/2$^+$		
1143.9 *2*	2.1 *3*	3936.8	37/2$^+$	2792.9	33/2$^+$	Q	DCO=0.94 *15*
1166.2 *2*	2.6 *4*	2007.0	25/2$^+$	840.8	21/2$^+$	Q	DCO=1.05 *12*
1210.8 *5*	<0.5	2615.4	27/2$^+$	1404.6	25/2$^+$		
1258.2 *2*	1.1 *2*	3321.4	33/2$^+$	2063.2	29/2$^+$	Q	DCO=1.02 *17*
1298.7 *2*	1.2 *2*	2139.5	23/2$^+$	840.8	21/2$^+$	D	DCO=0.77 *12*
1344.7[&] *5*	<0.5	2749.3	29/2$^+$	1404.6	25/2$^+$		
1352.8 *5*	0.83 *15*	1759.1	19/2$^+$	406.3	17/2$^+$		
1384.0 *5*	0.9 *2*	2224.8	25/2$^+$	840.8	21/2$^+$		

[†] 2014Ya30 state that uncertainties are 0.2 keV for most transitions, and 0.5 keV for γ rays with Iγ<1.

[‡] Assigned by the evaluator based on DCO ratios, where mult=Q indicates ΔJ=2, quadrupole (most likely E2) transition and mult=D indicates ΔJ=1, dipole or dipole with some quadrupole admixture. In a few cases, as noted, mult=D indicates ΔJ=0, dipole or dipole with some quadrupole admixture. For transitions below 500 keV, ΔJ=2, quadrupole transitions are assigned (E2) from RUL=1 for M2, assuming level half-life <10 ns.

[#] ΔJ=0 transition.

[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[&] Placement of transition in the level scheme is uncertain.

^{94}Zr(^{74}Ge,5nγ) 2014Ya30

Level Scheme

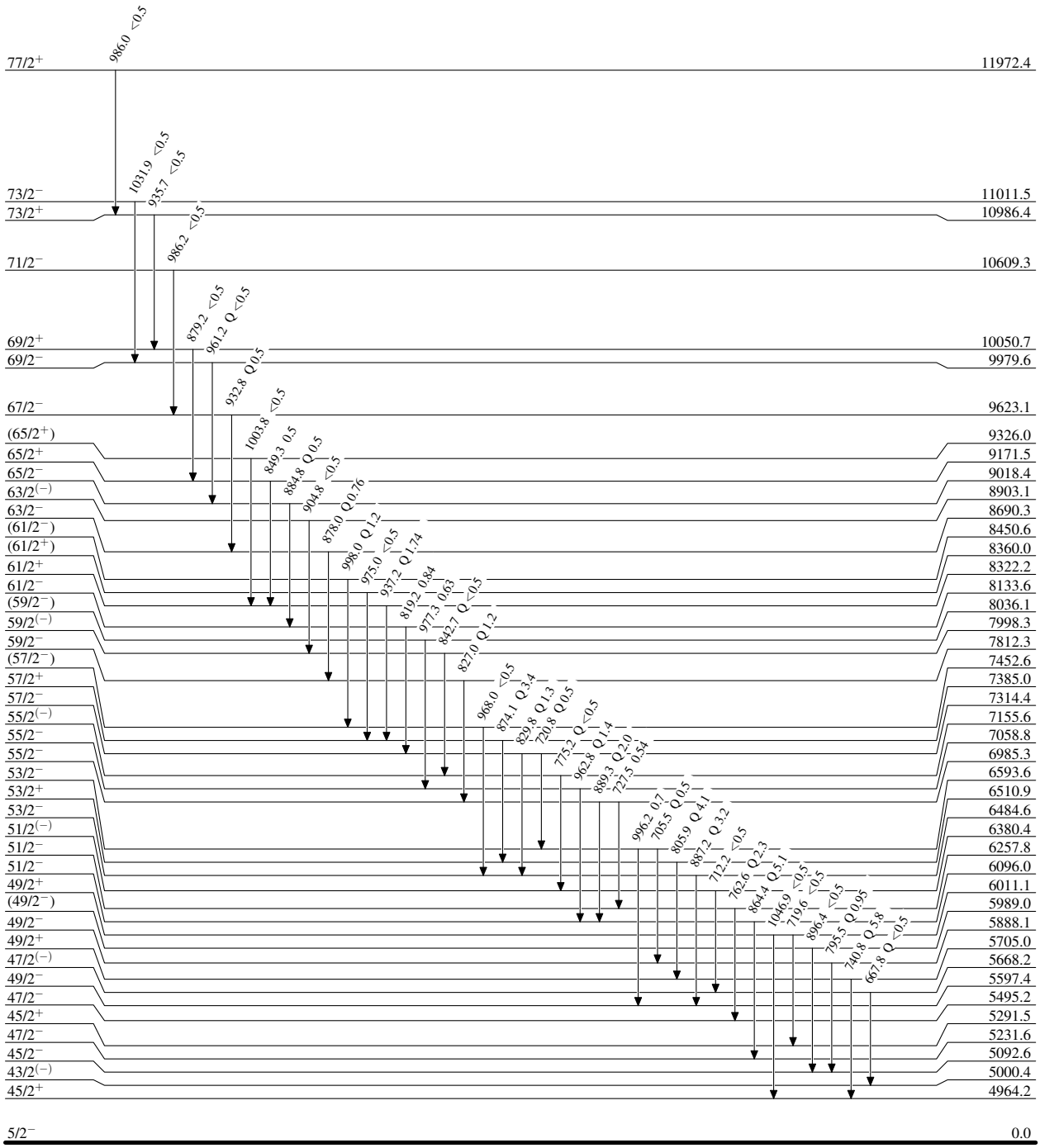
Intensities: Relative I_γ

Legend

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

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

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

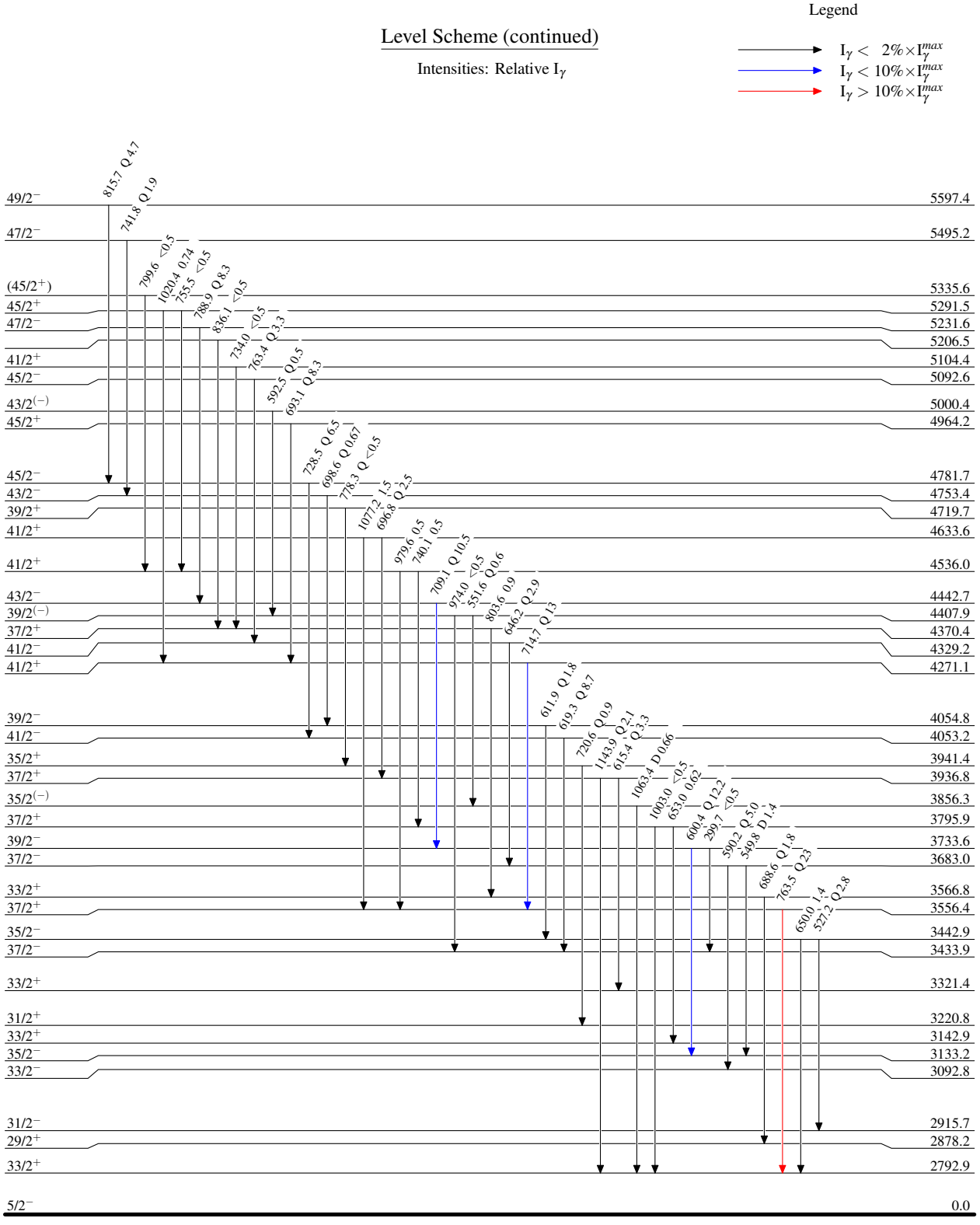


$^{163}_{72}Hf_{91}$

^{94}Zr(^{74}Ge,5nγ) 2014Ya30

Level Scheme (continued)

Intensities: Relative I_γ



$^{163}_{72}Hf_{91}$

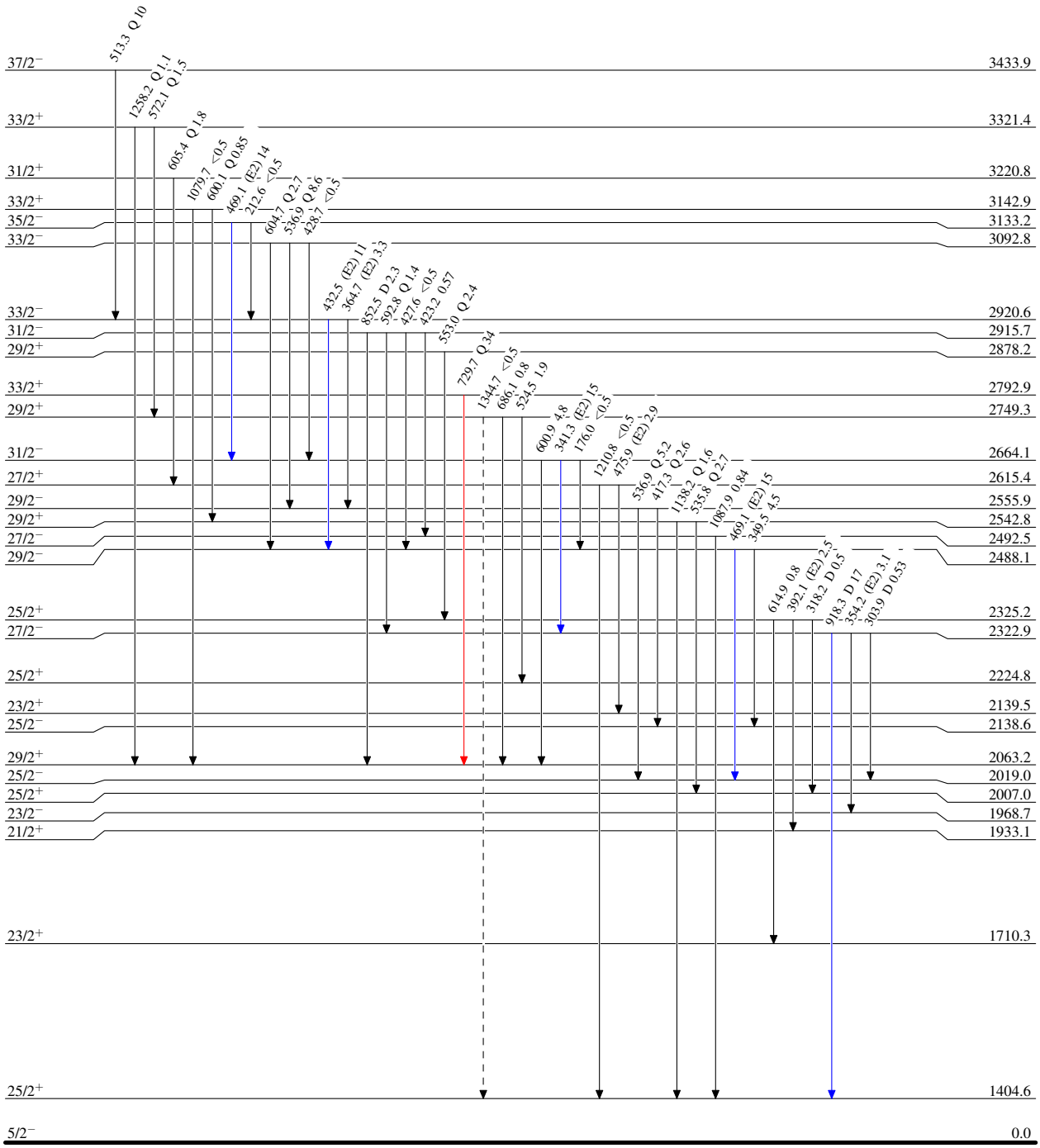
^{94}Zr(^{74}Ge,5nγ) 2014Ya30

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)

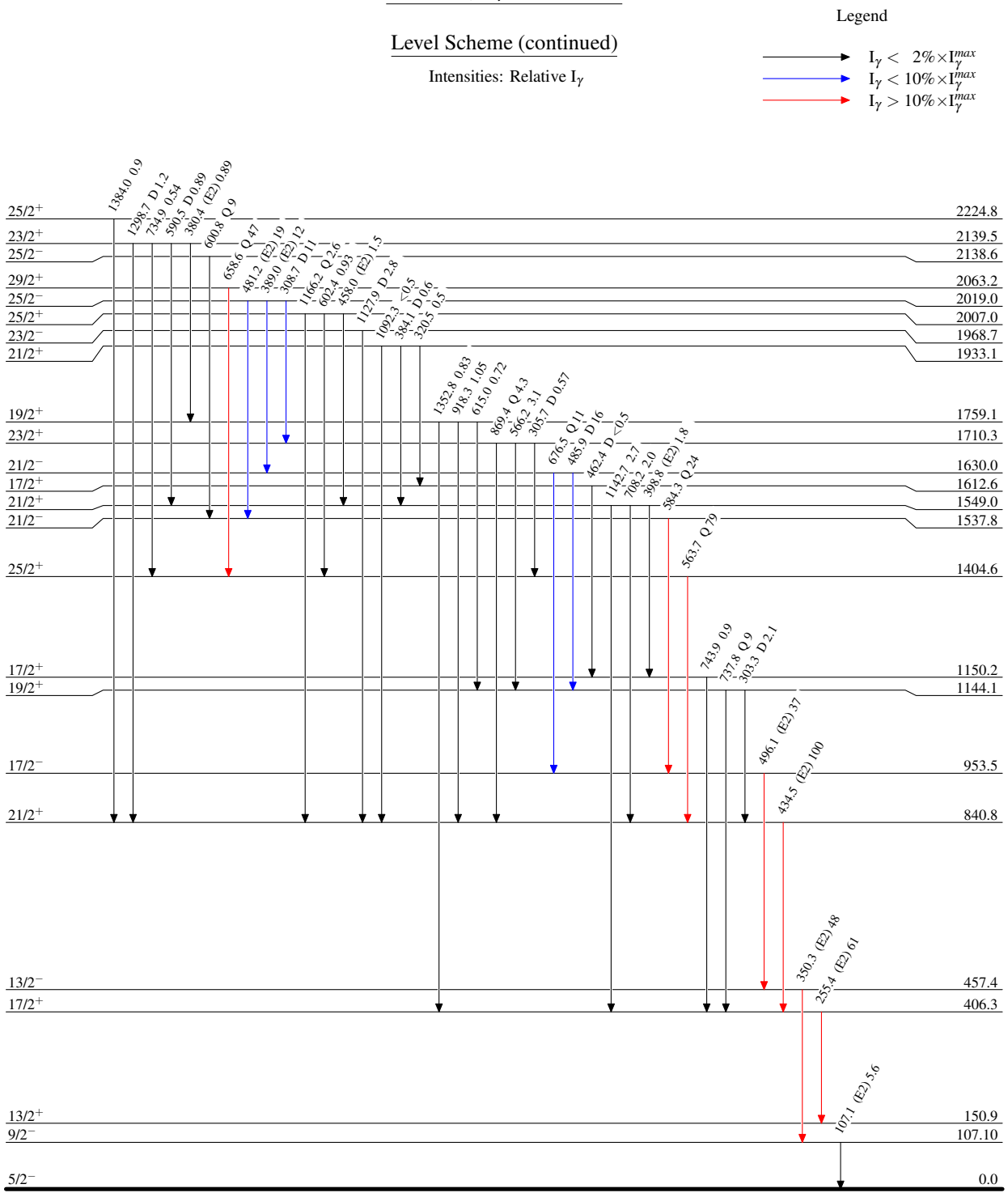


$^{163}_{72}Hf_{91}$

^{94}Zr(^{74}Ge,5nγ) 2014Ya30

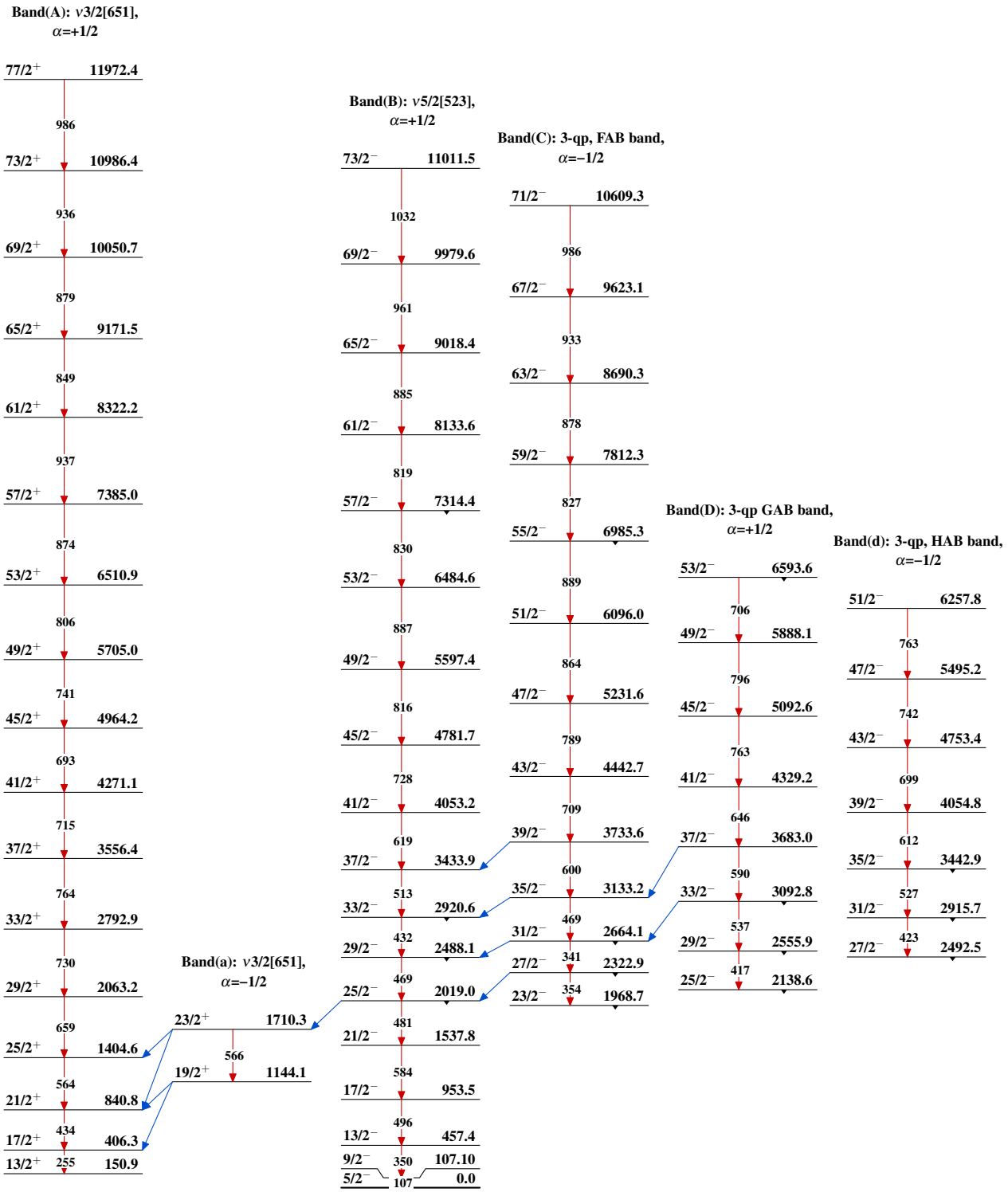
Level Scheme (continued)

Intensities: Relative I_γ



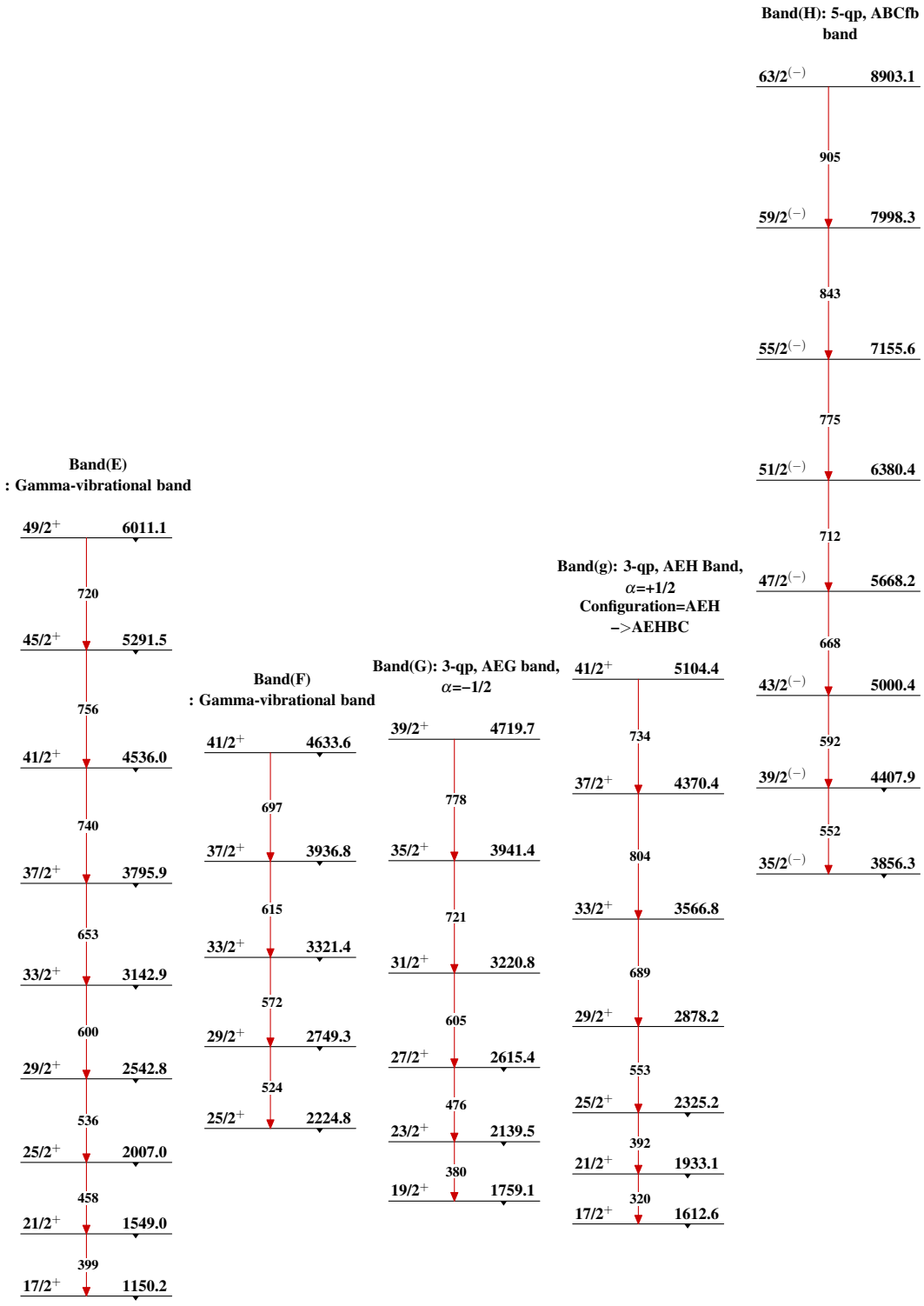
$^{163}_{72}Hf_{91}$

^{94}Zr(^{74}Ge,5nγ) 2014Ya30



$^{163}_{72}Hf_{91}$

^{94}Zr(^{74}Ge,5nγ) 2014Ya30 (continued)



$^{163}_{72}Hf_{91}$