^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111, 1807 (2010)	15-Jun-2010

2001Am02 (also 2000Wi19): E=310 MeV; GAMMASPHERE array (101 Compton-suppressed Ge detectors); measured Eγ, Iγ, γγ coin, lifetimes using DSAM, DCO ratios; deduced triaxial superdeformed structures and intrinsic quadrupole moment for one of the three highly-deformed bands reported.

2009Ya21, 2008Ya20: further details and analysis of experiment reported by 2001Am02, including information for normal deformation states; cranked relativistic meanfield calculations using Ultimate Cranker computer code.

Of the three triaxial strongly-deformed (TSD) bands reported in 2001Am02, TSD-1 is confirmed in the analysis by 2008Ya20, TSD-2 is relegated to an enhanced-deformation (ED) band and the TSD-3 band is relabeled as TSD-2 by 2008Ya20.

^{168}Hf Levels

The orbitals associated with the quasiparticle labels used here are the following:

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A: ν  5/2[642], α=+1/2;    B: ν  5/2[642], α=-1/2
C: ν  3/2[651], α=+1/2;    D: ν  3/2[651], α=-1/2
E: ν  5/2[523], α=+1/2;    F: ν  5/2[523], α=-1/2
G: ν  3/2[521], α=+1/2:    H: ν  3/2[521], α=-1/2
M: ν  1/2[521], α=+1/2;
a: π  7/2[404], α=+1/2;    b: π  7/2[404], α=-1/2
c: π  5/2[402], α=+1/2;    d: π  5/2[402], α=-1/2
m: π  1/2[660], α=+1/2;
e: π  9/2[514], α=+1/2;    f: π  9/2[514], α=-1/2
g: π  1/2[541], α=+1/2
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E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]
0.0[#]	0^+	2305.1[#] 4	12^+	3623.0[@] 4	16^+	4772.2[n] 6	17^-
124.03[#] 9	2^+	2320.5[i] 4	9^-	3776.6[a] 4	16^-	4808.6[r] 6	17^-
385.33[#] 22	4^+	2465.9[a] 4	10^-	3816.5[k] 5	15^-	4828.4[i] 6	19^-
756.4[#] 3	6^+	2473.0[&] 4	11^-	3831.4[#] 5	18^+	4893.5[p] 7	17^-
875.89?[f] 8	2^+[s]	2552.1[h] 4	10^-	3987.7[h] 4	16^-	4933.2[a] 5	20^-
942.01?[g] 11	0^+[s]	2645.2[i] 4	11^-	3988.5[&] 4	17^-	5010.9[m] 6	18^-
1030.84?[f] 11	3^+[s]	2705.5[j] 6	10^-	4085.4[m] 6	14^-	5026.6[k] 6	19^-
1058.57?[g] 9	2^+[s]	2827.4[a] 4	12^-	4117.9[j] 7	16^-	5028.9[q] 6	18^-
1160.13?[f] 24	4^+[s]	2851.4[k] 5	11^-	4189.1[i] 5	17^-	5048.1[@] 5	20^+
1212.7[#] 3	8^+	2856.4[#] 4	14^+	4295.8[n] 5	15^-	5123.0[#] 5	22^+
1284.53?[g] 13	4^+[s]	2936.7[&] 4	13^-	4321.2[@] 4	18^+	5138.4[o] 7	18^-
1385.3[f] 4	(5^+)	2975.5[h] 4	12^-	4335.2[a] 5	18^-	5145.4[e] 6	(19^-)
1496.9[h] 3	4^-	2989.5[@] 5	14^+	4414.3[k] 6	17^-	5167.7[l] 5	19^+
1549.9[f] 4	(6^+)	3065.0[i] 4	13^-	4438.8[#] 5	20^+	5196.2[&] 5	21^-
1734.4[&] 4	7^-	3084.5[j] 6	12^-	4449.3[r] 5	15^-	5212.2[h] 5	20^-
1735.1[#] 4	10^+	3268.4[a] 4	14^-	4466.6[p] 6	15^-	5245.2[n] 7	19^-
1812.7[h] 3	6^-	3288.0[k] 5	13^-	4527.7[m] 5	16^-	5274.0[r] 7	19^-
1991.8[a] 4	6^-	3309.4[#] 4	16^+	4576.7[&] 4	19^-	5328.0[j] 7	20^-
2066.0[&] 4	9^-	3441.1[&] 4	15^-	4577.4[h] 4	18^-	5411.5[p] 8	19^-
2080.4[i] 4	7^-	3451.0[h] 4	14^-	4614.6[q] 6	16^-	5477.8[i] 5	21^-
2154.7[h] 4	8^-	3560.4[j] 7	14^-	4670.4[o] 7	16^-	5495.4[m] 7	20^-
2192.7[a] 4	8^-	3588.4[i] 5	15^-	4714.4[j] 7	18^-	5543.7[q] 7	20^-

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$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)

^{168}Hf Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
5573.5[a] 5	22⁻	7705.0[i] 6	27⁻
5657.1[k] 8	21⁻	7795.4[o] 9	26⁻
5694.4[o] 8	20⁻	7837.5[n] 8	27⁻
5762.1[@] 5	22⁺	7841.8[r] 9	27⁻
5767.3[n] 7	21⁻	7860.0[a] 6	28⁻
5800.9[e] 7	(21⁻)	7918.1[k] 10	27⁻
5832.2[r] 8	21⁻	8036.9[e] 6	27⁻
5852.2[&] 5	23⁻	8074.3[c] 8	27⁻[tu]
5874.2[#] 5	24⁺	8116.1[@] 5	28⁺
5888.2[l] 5	21⁺	8196.3[&] 6	29⁻
5893.0[h] 5	22⁻	8200.5[p] 10	27⁻
5941.6[j] 7	22⁻	8208.1[q] 10	28⁻
6001.5[p] 8	21⁻	8243.7[m] 8	28⁻
6064.0[m] 7	22⁻	8269.7[j] 9	28⁻
6139.8[q] 8	22⁻	8329.1[h] 9	28⁻
6149.5[i] 5	23⁻	8365.0[l] 12	(27⁺)
6267.9[a] 6	24⁻	8500.3[#] 6	30⁺
6317.4[k] 8	23⁻	8586.0[r] 10	29⁻
6328.4[o] 8	22⁻	8593.5[i] 8	29⁻
6381.2[n] 7	23⁻	8619.4[o] 10	28⁻
6460.2[r] 8	23⁻	8664.7[n] 8	29⁻
6480.3[@] 5	24⁺	8761.6[a] 7	30⁻
6494.2[e] 6	23⁻	8811.0[k] 11	29⁻
6564.5[&] 6	25⁻	8844.7[c] 8	29⁻
6564.8[c] 9	23⁻	8987.1[q] 12	30⁻
6627.5[h] 6	24⁻	9039.9[@] 6	30⁺
6643.8[j] 7	24⁻	9052.5[p] 10	29⁻
6671.5[p] 8	23⁻	9101.4[m] 8	30⁻
6686.6[#] 5	26⁺	9113.0[&] 7	31⁻
6689.1[l] 5	23⁺	9173.3[j] 10	30⁻
6719.4[m] 7	24⁻	9262.1[h] 10	30⁻
6793.4[q] 9	24⁻	9385.0[r] 14	31⁻
6891.8[i] 6	25⁻	9500.0[#] 6	32⁺
7027.4[o] 9	24⁻	9500.4[o] 10	30⁻
7028.6[a] 6	26⁻	9551.6[i] 10	31⁻
7075.5[n] 8	25⁻	9555.6[n] 8	31⁻
7083.6[k] 8	25⁻	9660.5[c] 9	31⁻
7135.4[r] 9	25⁻	9730.0[a] 9	32⁻
7240.4[e] 6	25⁻	9748.6[k] 12	31⁻
7259.9[@] 5	26⁺	9961.5[p] 14	31⁻
7334.8[c] 8	25⁻	10016.1[@] 6	32⁺
7345.6[&] 6	27⁻	10024.4[m] 8	32⁻
7405.5[p] 9	25⁻	10089.5[&] 7	33⁻
7423.0[j] 7	26⁻	10131.6[j] 12	32⁻
7439.0[h] 7	26⁻	10226.1[h] 14	32⁻
7450.9[m] 8	26⁻	10438.4[o] 15	32⁻
7486.2[q] 9	26⁻	10512.6[n] 8	33⁻
7519.0[l] 5	25⁺	10529.9[c] 11	33⁻
7561.5[#] 6	28⁺	10550.7[#] 7	34⁺

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$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)

^{168}Hf Levels (continued)

E(level)[†]	Jπ[‡]	Comments
10566.6[i] *14*	33⁻	
10755.5[a] *10*	34⁻	
10755.6[k] *16*	33⁻	
11010.7[m] *8*	34⁻	
11042.3[@] *8*	34⁺	
11116.5[&] *7*	35⁻	
11138.8[j] *13*	34⁻	
11436.6[c] *12*	35⁻	
11532.1[n] *9*	35⁻	
11637.6[#] *7*	36⁺	
11827.7[a] *11*	36⁻	
12068.4[m] *11*	36⁻	
12101.3[@] *13*	36⁺	
12178.0[&] *8*	37⁻	
12185.8[j] *16*	36⁻	
12383.6[c] *13*	37⁻	
12618.2[n] *13*	37⁻	
12742.3[#] *9*	38⁺	
12930.8[a] *12*	38⁻	
13254.2[&] *9*	39⁻	
13373.6[c] *14*	39⁻	
13851.1[#] *10*	40⁺	
14037.9[a] *16*	40⁻	
14341.4[&] *10*	41⁻	
14414.1[c] *15*	41⁻	
14971.6[#] *11*	42⁺	
15460.5[&] *12*	43⁻	
15511.3[c] *16*	43⁻	
16127.1[#] *11*	44⁺	
16631.7[&] *13*	45⁻	
16669.3[c] *16*	45⁻	
17336.2[#] *12*	46⁺	
17865.7[&] *16*	47⁻	
17890.1[c] *17*	47⁻	
18605.2[#] *16*	48⁺	
19175.1[c] *20*	49⁻	
0.0+x[b]	J1≈(33)[tv]	Additional information 1.
677.2+x[b] *10*	J1+2	
1399.2+x[b] *15*	J1+4	
2169.8+x[b] *18*	J1+6	
2993.9+x[b] *20*	J1+8	
3871.2+x[b] *23*	J1+10	
4802.6+x[b] *25*	J1+12	
5787+x[b] *3*	J1+14	
6828+x[b] *3*	J1+16	
7926+x[b] *3*	J1+18	
9079+x[b] *4*	J1+20	

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

^{168}Hf Levels (continued)

E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]	E(level)[†]	J$^\pi$[‡]
10294+x?[b] 4	J1+22	1673.3+y[d] 15	J2+4	5635.8+y[d] 25	J2+12
11567+x?[b] 4	J1+24	2583.6+y[d] 18	J2+6	6771+y[d] 3	J2+14
0.0+y[d]	J2≈(28)[t]	3544.2+y[d] 20	J2+8	7966+y?[d] 3	J2+16
811.1+y[d] 10	J2+2	4560.8+y[d] 23	J2+10	9222+y?[d] 3	J2+18

[†] From least-squares fit to Eγ, allowing an uncertainty of 1 keV In Eγ data for which authors give No uncertainty.

[‡] Values are those recommended by 2009Ya21 based on their deduced band structure, taking into account γ multipolarities, band crossing frequencies, alignment gains, decay patterns and systematic comparisons with neighboring nuclides, except As noted.

[#] Band(A): g.s. band. Sharp AB crossing At $\hbar\omega$=265 keV (analogous to that In other N=96 nuclei), alignment gain 9.0$\hbar$; fg crossing At $\hbar\omega$=550 keV, alignment gain 6.1$\hbar$. yrast band.

[@] Band(B): α=0 BC band. Continuation of g.s. band after BC crossing. AD crossing At $\hbar\omega$=360 keV.

[&] Band(C): π=−, α=1, AE band. BC crossing At $\hbar\omega$=300 keV, alignment gain 7.0$\hbar$; fg crossing At $\hbar\omega$=540 keV, alignment gain 5.2$\hbar$. rotation aligned band. Lowest observed J=5.

[a] Band(D): π=−, α=0, AF band. BC crossing At $\hbar\omega$=290 keV, alignment gain 6.8$\hbar$; fg crossing At $\hbar\omega$=550 keV, alignment gain >3.5$\hbar$. Partner with AM band for J≤14, but with AE band for J≥18.

[b] Band(E): triaxial SD-1 band (2001Am02). Q(transition)≈11.4 (2001Am02; from fractional centroid shift, allowing for side-feeding). Population relative to ^{168}Hf channel=0.26% 10 (2001Am02). Probable configuration=$\pi i^2_{13/2}\otimes\nu(j_{15/2}i_{13/2})$, α=1. This band decays mainly to the negative-parity normal deformation AE and AF bands, as indicated by observed coincidence of all γ-rays in the SD-1 band with those in the AE and AF bands below J=31 and and J=30, respectively (2008Ya20).

[c] Band(F): enhanced-deformation band (2009Ya21). Population relative to ^{168}Hf channel=0.15% 6 (2001Am02). lowest observed J≈23. This band was labeled as TSD-2 band in 2001Am02 but was renamed by 2008Ya20 and 2009Ya21; the latter authors also assign J values 1$\hbar$ lower than estimated by 2001Am02. Probable configuration=$\pi(i_{13/2}h_{9/2})\otimes\nu i^2_{13/2}$, α=1 (2008Ya20).

[d] Band(G): triaxial SD-2 band (2001Am02). Population relative to ^{168}Hf channel=0.12% 5 (2001Am02). This is the triaxial SD-3 band from 2001Am02 which was relabelled As triaxial SD-2 band by 2008Ya20.

[e] Band(H): π=−, α=1 band. Lowest observed member is the (19$^-$) 5145 level. band has characteristics consistent with expectations for the BF band (2009Ya21).

[f] Band(I): K$^\pi$=2$^+$ γ-vibration band.

[g] Band(J): K$^\pi$=0$^+$ β^-vibration band.

[h] Band(K): π=−, α=0 BE band. Lowest observed J=4. excitation energies higher than In AF band for J>10. AD crossing around $\hbar\omega$=320 keV.

[i] Band(L): π=−, α=1 AM band. Lowest observed J is 7. Energies are higher than AE sequence but lower than In BE band. BC crossing At $\hbar\omega$=320 keV, alignment gain 4.5$\hbar$.

[j] Band(M): π=−, α=0 AH band. Slightly delayed BC crossing At $\hbar\omega$=300 keV, alignment gain 6.2$\hbar$. Lowest observed J=10.

[k] Band(m): π=−, α=1 AG band. BC crossing At $\hbar\omega$≈300 keV, alignment gain 5.4$\hbar$.

[l] Band(N): π=(+), α=1 band. Possible extension of g.s. band with an AC alignment (2009Ya21).

[m] Band(O): π=−, α=0 gaAB,gcAB mixed band. Lowest observed J=14. band crossing At $\hbar\omega$≈240 keV. Likely configuration (2009Ya21): (π 1/2[541])(π 7/2[404])⊗(ν 5/2[642])^2 mixed with (π 1/2[541])(π 5/2[402])⊗(ν 5/2[642])^2 and having K≈3.5.

[n] Band(o): π=−, α=1 gbAB,gdAB mixed band. See comment on signature partner band.

[o] Band(P): K$^\pi$=(10$^-$), α=0 geBE band. Likely configuration (2009Ya21): (π 1/2[541])+(π 9/2[514])+(ν 5/2[642])+(ν 5/2[523]),

[p] Band(p): K$^\pi$=(10$^-$), α=1 gfBE band. See comment on signature partner band.

[q] Band(Q): K$^\pi$=(10$^-$), α=0 geAE band. Strongly-coupled high-K band. likely configuration (2009Ya21): (π 1/2[541])+(π 9/2[514])+(ν 5/2[642])+(ν 5/2[523]), consistent with measured B(M1)/B(E2) ratios. BC crossing occurs At J=23, $\hbar\omega$=315 keV, alignment gain 6.0$\hbar$. deformation aligned band.

[r] Band(q): K$^\pi$=(10$^-$), α=1 gfAE band. See comment on signature partner band.

[s] From Adopted Levels.

[t] Spin estimates for the lowest levels observed by 2001Am02 in the two triaxial SD bands and the enhanced deformation band

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$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)

^{168}Hf Levels (continued)

were made by 2001Am02 based on obtaining reasonable alignments when compared to normal-deformed structures and triaxial superdeformed structures in Lu nuclides; the uncertainty in this estimate was thought to be 2 or 3 units of spin. 2008Ya20 revised the value for the SD-1 band (now 12 ℏ higher) and 2009Ya21 increased J for the enhanced deformation band by 3 ℏ.

[u] From 2008Ya20, 2009Ya21. supersedes J=(24) suggested by 2001Am02.

[v] Approximate value from 2008Ya20; supersedes J=(21) estimated In 2001Am02. intraband 377γ feeding this level is coincident with transitions In AE and AF bands below J=31 and J=30 levels, respectively.

$\gamma(^{168}Hf)$

E_γ[†]	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[‡]	Comments
123.6 *2*	23 *2*	124.03	2+	0.0	0+		
127.8 *5*	<0.5	2320.5	9−	2192.7	8−		
145.4 *5*	0.7 *1*	2465.9	10−	2320.5	9−	D	Mult.: DCO=0.41 *7*.
165[&]		1549.9	(6+)	1385.3	(5+)		
165.3 *5*	<0.5	4614.6	16−	4449.3	15−	D	Mult.: DCO=0.78 *16*.
179.4 *5*	<0.5	2645.2	11−	2465.9	10−		
182.2 *5*	<0.5	2827.4	12−	2645.2	11−	D	Mult.: DCO=0.59 *8*.
194.0 *5*	<0.5	4808.6	17−	4614.6	16−	D	Mult.: DCO=0.65 *7*.
200.9 *5*	0.9 *1*	2192.7	8−	1991.8	6−		
203.9 *5*	<0.5	4670.4	16−	4466.6	15−	D	Mult.: DCO=0.82 *10*.
210.4 *5*	0.7 *2*	4295.8	15−	4085.4	14−	D	Mult.: DCO=0.96 *11*, gating on ΔJ=1 transition.
220.3 *5*	0.7 *1*	5028.9	18−	4808.6	17−	D	Mult.: DCO=1.03 *12*, gating on ΔJ=1 transition.
223.1 *5*	0.8 *1*	4893.5	17−	4670.4	16−	D	Mult.: DCO=0.70 *8*.
231.9 *2*	1.0 *2*	4527.7	16−	4295.8	15−	D	Mult.: DCO=0.78 *10*.
233.0 *5*	<0.5	3084.5	12−	2851.4	11−	D	Mult.: DCO=0.61 *8*.
234.3 *5*	<0.5	5245.2	19−	5010.9	18−	D	Mult.: DCO=0.65 *9*.
237.6 *5*	<0.5	3065.0	13−	2827.4	12−		
238.7 *5*	<0.5	5010.9	18−	4772.2	17−	D	Mult.: DCO=0.93 *10*, gating on ΔJ=1 transition.
240.0 *2*	1.0 *2*	2320.5	9−	2080.4	7−		
244.5 *5*	0.7 *1*	4772.2	17−	4527.7	16−	D	Mult.: DCO=0.76 *10*.
244.9 *5*	0.7 *1*	5138.4	18−	4893.5	17−	D	Mult.: DCO=0.78 *10*.
245.1 *5*	0.5 *1*	5274.0	19−	5028.9	18−	D	Mult.: DCO=0.81 *10*.
250.2 *2*	1.9 *3*	5495.4	20−	5245.2	19−	D	Mult.: DCO=0.74 *8*.
255.4 *5*	<0.5	4576.7	19−	4321.2	18+		
261.3 *2*	100 *3*	385.33	4+	124.03	2+	Q	Mult.: DCO=1.09 *10*.
262.8 *2*	1.2 *3*	1812.7	6−	1549.9	(6+)		
269.7 *5*	0.5 *1*	5543.7	20−	5274.0	19−	D	Mult.: DCO=0.68 *8*.
271.9 *2*	1.8 *3*	5767.3	21−	5495.4	20−	D	Mult.: DCO=0.70 *8*.
273.1 *5*	<0.5	5411.5	19−	5138.4	18−	D	Mult.: DCO=1.03 *12*, gating on ΔJ=1 transition.
273.2 *2*	5.9 *6*	2465.9	10−	2192.7	8−	Q	Mult.: DCO=0.91 *8*.
282.9 *5*	<0.5	5694.4	20−	5411.5	19−	D	Mult.: DCO=1.17 *13*, gating on ΔJ=1 transition.
288.5 *5*	0.5 *1*	5832.2	21−	5543.7	20−	D	Mult.: DCO=0.58 *9*.
296.7 *2*	2.1 *2*	6064.0	22−	5767.3	21−	D	Mult.: DCO=0.75 *10*.
307.1 *5*	0.8 *1*	6001.5	21−	5694.4	20−	D	Mult.: DCO=0.63 *7*.
307.6 *5*	<0.5	6139.8	22−	5832.2	21−	D	Mult.: DCO=0.69 *10*.
311.2 *2*	2.0 *2*	2465.9	10−	2154.7	8−	(Q)	Mult.: DCO=0.87 *7*.
316.0 *5*	0.5 *2*	1812.7	6−	1496.9	4−		
317.2 *2*	1.5 *2*	6381.2	23−	6064.0	22−	D	Mult.: DCO=0.63 *8*.
319.8 *2*	2.0 *2*	3309.4	16+	2989.5	14+		
320.4 *5*	<0.5	6460.2	23−	6139.8	22−	D	Mult.: DCO=0.62 *5*.
324.8 *2*	1.5 *2*	2645.2	11−	2320.5	9−	Q	Mult.: DCO=1.02 *12*.
326.9 *5*	0.7 *1*	6328.4	22−	6001.5	21−	D	Mult.: DCO=0.61 *8*.
331.8 *5*	0.7 *1*	2066.0	9−	1734.4	7−	Q	Mult.: DCO=0.97 *12*.
333.2 *5*	<0.5	6793.4	24−	6460.2	23−	D	Mult.: DCO=1.02 *10*, gating on ΔJ=1 transition.
338.2 *2*	1.1 *3*	6719.4	24−	6381.2	23−	D	Mult.: DCO=0.71 *8*.

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	Comments
341.9 *5*	0.5 *1*	7135.4	25⁻	6793.4	24⁻	D	Mult.: DCO=0.69 *7*.
342.0 *2*	2.0 *5*	2154.7	8⁻	1812.7	6⁻		
343.1 *5*	0.6 *1*	6671.5	23⁻	6328.4	22⁻	D	Mult.: DCO=0.77 *9*.
350.8 *5*	<0.5	7486.2	26⁻	7135.4	25⁻	D	Mult.: DCO=1.11 *15*, gating on ΔJ=1 transition.
355.6 *5*	<0.5	7841.8	27⁻	7486.2	26⁻		
355.9 *5*	<0.5	7027.4	24⁻	6671.5	23⁻	D	Mult.: DCO=0.94 *11*, gating on ΔJ=1 transition.
356.1 *5*	0.6 *1*	7075.5	25⁻	6719.4	24⁻	D	Mult.: DCO=0.95 *8*, gating on ΔJ=1 transition.
359.3 *5*	<0.5	4808.6	17⁻	4449.3	15⁻		
359.4 *2*	1.0 *1*	2552.1	10⁻	2192.7	8⁻		
361.6 *2*	9.2 *8*	2827.4	12⁻	2465.9	10⁻	Q	Mult.: DCO=0.93 *9*.
365.5 *5*	<0.5	3988.5	17⁻	3623.0	16⁺	D	Mult.: DCO=0.55 *8*.
366.4 *5*	<0.5	8208.1	28⁻	7841.8	27⁻		
371.0 *2*	100 *3*	756.4	6⁺	385.33	4⁺	Q	Mult.: DCO=1.40 *15* for ΔJ=1 γ In gate.
375.4 *5*	<0.5	7450.9	26⁻	7075.5	25⁻	D	Mult.: DCO=0.97 *9*, gating on ΔJ=1 transition.
377.8 *5*	<0.5	8586.0	29⁻	8208.1	28⁻		
378.1 *5*	<0.5	7405.5	25⁻	7027.4	24⁻	D	Mult.: DCO=1.02 *11*, gating on ΔJ=1 transition.
379.0 *5*	0.9 *2*	3084.5	12⁻	2705.5	10⁻	Q	Mult.: DCO=0.97 *15*.
380.0 *2*	3.0 *6*	2192.7	8⁻	1812.7	6⁻	Q	Mult.: DCO=0.91 *12*.
386.6 *2*	1.7 *2*	7837.5	27⁻	7450.9	26⁻	D	Mult.: DCO=0.97 *10*, gating on ΔJ=1 transition.
389.9 *5*	<0.5	7795.4	26⁻	7405.5	25⁻	D	Mult.: DCO=0.72 *9*.
397.4 *2*	2.5 *3*	2552.1	10⁻	2154.7	8⁻	Q	Mult.: DCO=1.05 *9*.
399.7 *5*	0.5 *1*	2465.9	10⁻	2066.0	9⁻		
401 *1*	<0.5	8987.1	30⁻	8586.0	29⁻		
405.1 *5*	<0.5	8200.5	27⁻	7795.4	26⁻		
406.2 *2*	1.3 *2*	8243.7	28⁻	7837.5	27⁻		
406.9 *2*	3.6 *4*	2473.0	11⁻	2066.0	9⁻	Q	Mult.: DCO=0.97 *14*.
414.3 *5*	<0.5	5028.9	18⁻	4614.6	16⁻	Q	Mult.: DCO=1.32 *13*, gating on ΔJ=1 transition.
418.9 *5*	<0.5	8619.4	28⁻	8200.5	27⁻		
419.8 *5*	0.8 *2*	3065.0	13⁻	2645.2	11⁻	Q	Mult.: DCO=0.93 *11*.
420.3 *2*	1.5 *2*	2154.7	8⁻	1734.4	7⁻		
421.0 *2*	1.6 *3*	8664.7	29⁻	8243.7	28⁻		
423.5 *2*	1.9 *3*	2975.5	12⁻	2552.1	10⁻	Q	Mult.: DCO=0.98 *11*.
426.8 *5*	<0.5	4893.5	17⁻	4466.6	15⁻		
427.4 *2*	1.0 *1*	1812.7	6⁻	1385.3	(5⁺)		
433.1 *5*	<0.5	9052.5	29⁻	8619.4	28⁻		
436.6 *5*	0.8 *2*	3288.0	13⁻	2851.4	11⁻	(Q)	Mult.: DCO=0.92 *14*.
436.7 *5*	0.6 *1*	9101.4	30⁻	8664.7	29⁻		
441.0 *2*	9.2 *9*	3268.4	14⁻	2827.4	12⁻	Q	Mult.: DCO=0.98 *8*.
442.3 *5*	<0.5	4527.7	16⁻	4085.4	14⁻	Q	Mult.: DCO=1.39 *16*, gating on ΔJ=1 transition.
447.9 *5*	<0.5	9500.4	30⁻	9052.5	29⁻		
451.6 *2*	1.6 *2*	3441.1	15⁻	2989.5	14⁺		
452.9 *2*	45 *3*	3309.4	16⁺	2856.4	14⁺		
454.2 *2*	1.0 *2*	9555.6	31⁻	9101.4	30⁻		
456.3 *2*	96 *3*	1212.7	8⁺	756.4	6⁺	Q	Mult.: DCO=1.42 *16* for ΔJ=1 γ In gate.
463.7 *2*	13.5 *9*	2936.7	13⁻	2473.0	11⁻	Q	Mult.: DCO=0.98 *10*.
465.4 *5*	<0.5	5274.0	19⁻	4808.6	17⁻		
468.0 *5*	<0.5	5138.4	18⁻	4670.4	16⁻		
468.8 *2*	1.3 *2*	10024.4	32⁻	9555.6	31⁻		
473.0 *5*	<0.5	5245.2	19⁻	4772.2	17⁻	Q	Mult.: DCO=1.27 *15*, gating on ΔJ=1 transition.
475.5 *2*	2.5 *3*	3451.0	14⁻	2975.5	12⁻	Q	Mult.: DCO=1.06 *9*.
475.9 *5*	0.9 *1*	3560.4	14⁻	3084.5	12⁻	Q	Mult.: DCO=0.98 *11*.
476.4 *5*	<0.5	4772.2	17⁻	4295.8	15⁻	Q	Mult.: DCO=1.49 *15*, gating on ΔJ=1 transition.
483.2 *5*	<0.5	5010.9	18⁻	4527.7	16⁻	Q	Mult.: DCO=1.61 *18*, gating on ΔJ=1 transition.
484.5 *5*	<0.5	5495.4	20⁻	5010.9	18⁻		
485.9 *5*	0.6 *2*	2552.1	10⁻	2066.0	9⁻	D	Mult.: DCO=0.72 *9*.
488.2 *2*	1.3 *2*	10512.6	33⁻	10024.4	32⁻		

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
498.1 *5*	0.7 *1*	11010.7	34⁻	10512.6	33⁻		
502.5 *5*	0.9 *3*	2975.5	12⁻	2473.0	11⁻	D	Mult.: DCO=0.73 *10*.
504.4 *2*	16 *2*	3441.1	15⁻	2936.7	13⁻	Q	Mult.: DCO=0.97 *10*.
508.2 *2*	8.1 *8*	3776.6	16⁻	3268.4	14⁻	Q	Mult.: DCO=0.98 *7*.
509.7 *5*	<0.5	2975.5	12⁻	2465.9	10⁻		
514.3 *5*	<0.5	3451.0	14⁻	2936.7	13⁻		
514.8 *5*	<0.5	5543.7	20⁻	5028.9	18⁻		
518.0 *5*	<0.5	5411.5	19⁻	4893.5	17⁻		
521.4 *5*	0.7 *1*	11532.1	35⁻	11010.7	34⁻		
521.9 *2*	43 *3*	3831.4	18⁺	3309.4	16⁺		
522.1 *5*	<0.5	5767.3	21⁻	5245.2	19⁻	Q	Mult.: DCO=1.45 *16*, gating on ΔJ=1 transition.
522.4 *2*	81 *3*	1735.1	10⁺	1212.7	8⁺		
523.4 *2*	1.0 *1*	3588.4	15⁻	3065.0	13⁻		
528.5 *2*	1.5 *2*	3816.5	15⁻	3288.0	13⁻	Q	Mult.: DCO=1.19 *13*.
536 *1*	0.7 *1*	12068.4	36⁻	11532.1	35⁻		
536.7 *2*	2.3 *3*	3987.7	16⁻	3451.0	14⁻	Q	Mult.: DCO=1.05 *8*.
546.6 *5*	<0.5	3987.7	16⁻	3441.1	15⁻		
547.4 *2*	14 *2*	3988.5	17⁻	3441.1	15⁻	Q	Mult.: DCO=1.03 *10*.
551.3 *2*	45 *2*	2856.4	14⁺	2305.1	12⁺	Q	Mult.: DCO=0.98 *10*.
556.0 *5*	0.7 *1*	5694.4	20⁻	5138.4	18⁻		
557.5 *5*	0.8 *1*	4117.9	16⁻	3560.4	14⁻	Q	Mult.: DCO=1.03 *9*.
558.2 *5*	<0.5	5832.2	21⁻	5274.0	19⁻	Q	Mult.: DCO=1.67 *20*, gating on ΔJ=1 transition.
558.6 *2*	7.5 *9*	4335.2	18⁻	3776.6	16⁻	Q	Mult.: DCO=1.08 *7*.
568.6 *5*	<0.5	6064.0	22⁻	5495.4	20⁻		
570.0 *2*	70 *3*	2305.1	12⁺	1735.1	10⁺	Q	Mult.: DCO=1.09 *11*.
579.1 *2*	1.0 *2*	2645.2	11⁻	2066.0	9⁻		
586.1 *2*	1.1 *2*	2320.5	9⁻	1734.4	7⁻		
588.2 *2*	12 *2*	4576.7	19⁻	3988.5	17⁻	Q	Mult.: DCO=0.99 *5*.
588.9 *5*	<0.5	4577.4	18⁻	3988.5	17⁻		
589.7 *2*	1.8 *2*	4577.4	18⁻	3987.7	16⁻	Q	Mult.: DCO=1.04 *10*.
590.0 *2*	1.0 *1*	6001.5	21⁻	5411.5	19⁻		
592.0 *5*	0.9 *1*	3065.0	13⁻	2473.0	11⁻		
596.1 *5*	<0.5	6139.8	22⁻	5543.7	20⁻	Q	Mult.: DCO=0.96 *13*.
596.5 *2*	1.0 *2*	4714.4	18⁻	4117.9	16⁻	Q	Mult.: DCO=0.91 *8*.
597.8 *2*	1.3 *2*	4414.3	17⁻	3816.5	15⁻	Q	Mult.: DCO=0.93 *12*.
598.0 *2*	6.3 *8*	4933.2	20⁻	4335.2	18⁻	Q	Mult.: DCO=1.05 *8*.
600.7 *5*	0.9 *1*	4189.1	17⁻	3588.4	15⁻	(Q)	Mult.: DCO=0.93 *12*.
607.3 *2*	19 *2*	4438.8	20⁺	3831.4	18⁺	Q	Mult.: DCO=0.95 *9*.
612.3 *2*	1.3 *3*	5026.6	19⁻	4414.3	17⁻		Mult.: DCO=0.89 *14*.
613.6[c] *2*	1.3[c] *2*	5328.0	20⁻	4714.4	18⁻		Mult.: DCO=1.04 *13* for doubly-placed G.
613.6[c] *2*	1.3[c] *2*	5941.6	22⁻	5328.0	20⁻		
613.9 *2*	1.0 *2*	6381.2	23⁻	5767.3	21⁻	Q	Mult.: DCO=0.98 *14*.
619.5 *2*	10 *2*	5196.2	21⁻	4576.7	19⁻	Q	Mult.: DCO=1.02 *10*.
623.6 *5*	<0.5	3451.0	14⁻	2827.4	12⁻		
628.0 *5*	0.6 *1*	6460.2	23⁻	5832.2	21⁻	Q	Mult.: DCO=1.02 *11*.
630.5 *5*	0.9 *2*	5657.1	21⁻	5026.6	19⁻	Q	Mult.: DCO=0.98 *13*.
631.7 *2*	9.8 *9*	2936.7	13⁻	2305.1	12⁺	D	Mult.: DCO=0.62 *9*.
633.5 *2*	15 *2*	3623.0	16⁺	2989.5	14⁺		
634.0 *2*	1.2 *2*	6328.4	22⁻	5694.4	20⁻	Q	Mult.: DCO=0.96 *8*.
634.8 *2*	1.5 *2*	5212.2	20⁻	4577.4	18⁻	Q	Mult.: DCO=0.99 *11*.
635.5 *5*	<0.5	5212.2	20⁻	4576.7	19⁻		
639.3 *5*	<0.5	4828.4	19⁻	4189.1	17⁻	Q	Mult.: DCO=1.09 *11*.
640.3 *2*	4.4 *6*	5573.5	22⁻	4933.2	20⁻	Q	Mult.: DCO=1.02 *9*.
649.5 *5*	0.6 *1*	5477.8	21⁻	4828.4	19⁻	Q	Mult.: DCO=1.10 *12*.
651.7 *5*	<0.5	3588.4	15⁻	2936.7	13⁻		

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
653.6 5	<0.5	6793.4	24⁻	6139.8	22⁻	Q	Mult.: DCO=1.02 13.
655.4 5	0.7 1	6719.4	24⁻	6064.0	22⁻	Q	Mult.: DCO=1.37 15, gating on ΔJ=1 transition.
655.5 5	<0.5	5800.9	(21⁻)	5145.4	(19⁻)		
656.0 2	8.8 5	5852.2	23⁻	5196.2	21⁻	Q	Mult.: DCO=1.02 9.
660.3 2	1.3 3	6317.4	23⁻	5657.1	21⁻	Q	Mult.: DCO=1.03 10.
670.0 5	0.7 1	6671.5	23⁻	6001.5	21⁻	Q	Mult.: DCO=1.02 15.
671.7 5	0.5 1	6149.5	23⁻	5477.8	21⁻	Q	Mult.: DCO=0.93 10.
675.1 5	<0.5	7135.4	25⁻	6460.2	23⁻	Q	Mult.: DCO=0.93 10.
677.2[#]	0.73 12	677.2+x	J1+2	0.0+x	J1≈(33)	Q[b]	DCO=1.05 11
680.8 2	1.0 1	5893.0	22⁻	5212.2	20⁻	Q	Mult.: DCO=1.03 10.
684.1 2	24 3	5123.0	22⁺	4438.8	20⁺		
684.5 2	13.5 6	2989.5	14⁺	2305.1	12⁺		
692.7 5	<0.5	7486.2	26⁻	6793.4	24⁻		
693.4 5	<0.5	6494.2	23⁻	5800.9	(21⁻)		
694.3 5	0.5 1	7075.5	25⁻	6381.2	23⁻	Q	Mult.: DCO=1.05 11.
694.4 2	3.3 4	6267.9	24⁻	5573.5	22⁻	Q	Mult.: DCO=1.03 9.
698.3 2	4.4 7	4321.2	18⁺	3623.0	16⁺		
699.0 5	<0.5	7027.4	24⁻	6328.4	22⁻	Q	Mult.: DCO=1.08 11.
702.1 5	<0.5	8036.9	27⁻	7334.8	25⁻		
702.2 2	1.1 2	6643.8	24⁻	5941.6	22⁻	Q	Mult.: DCO=1.05 10.
706.4 5	0.5 1	7841.8	27⁻	7135.4	25⁻	Q	Mult.: DCO=1.07 12.
712.3 2	6.9 9	6564.5	25⁻	5852.2	23⁻	Q	Mult.: DCO=1.03 9.
714.1 2	2.3 3	5762.1	22⁺	5048.1	20⁺		
718.3 2	3.2 4	6480.3	24⁺	5762.1	22⁺		
719.3 5	<0.5	3987.7	16⁻	3268.4	14⁻		
720.5 2	1.2 2	5888.2	21⁺	5167.7	19⁺	Q	Mult.: DCO=1.10 12.
722.0[#]		1399.2+x	J1+4	677.2+x	J1+2	Q[b]	DCO=0.92 10
722.0 5	<0.5	8208.1	28⁻	7486.2	26⁻		
726.9 2	5.3 6	5048.1	20⁺	4321.2	18⁺		
731.5 2	1.2 2	7450.9	26⁻	6719.4	24⁻	Q	Mult.: DCO=1.39 16, gating on ΔJ=1 transition.
734.0 5	0.5 1	7405.5	25⁻	6671.5	23⁻	Q	Mult.: DCO=1.33 22, gating on ΔJ=1 transition.
734.5 5	0.7 1	6627.5	24⁻	5893.0	22⁻	Q	Mult.: DCO=1.03 10.
738.0 2	8.4 8	2473.0	11⁻	1735.1	10⁺	D	Mult.: DCO=0.64 14.
739.5 5	<0.5	8074.3	27⁻	7334.8	25⁻	Q	Mult.: DCO=0.93 14.
742.3 5	<0.5	6891.8	25⁻	6149.5	23⁻	Q	Mult.: DCO=1.06 8.
744.2 5	<0.5	8586.0	29⁻	7841.8	27⁻		
746.2 5	<0.5	7240.4	25⁻	6494.2	23⁻		
748.0 5	<0.5	4189.1	17⁻	3441.1	15⁻		
751.0 2	15 1	5874.2	24⁺	5123.0	22⁺		
751.81[ad] 8		875.89?	2⁺	124.03	2⁺		
752.8[d] 5	<0.5	5800.9	(21⁻)	5048.1	20⁺		
760.7 2	2.5 4	7028.6	26⁻	6267.9	24⁻	Q	Mult.: DCO=1.02 9.
762.0 2	1.2 2	7837.5	27⁻	7075.5	25⁻	Q	Mult.: DCO=1.10 11.
766.2 2	1.3 2	7083.6	25⁻	6317.4	23⁻	Q	Mult.: DCO=1.05 13.
766.6 2	3.6 4	3623.0	16⁺	2856.4	14⁺		
768.0 5	<0.5	7795.4	26⁻	7027.4	24⁻	Q	Mult.: DCO=1.11 16.
770.0 5	<0.5	7334.8	25⁻	6564.8	23⁻		
770.4 5	<0.5	8844.7	29⁻	8074.3	27⁻	Q	Mult.: DCO=1.10 16.
770.6[#]	0.97 7	2169.8+x	J1+6	1399.2+x	J1+4	Q[b]	DCO=1.10 7
774.80[ad] 9		1160.13?	4⁺	385.33	4⁺		
779	<0.5	8987.1	30⁻	8208.1	28⁻		
779.2 5	0.6 1	7423.0	26⁻	6643.8	24⁻	Q	Mult.: DCO=0.94 13.
779.8 2	1.4 2	7259.9	26⁺	6480.3	24⁺		
781.1 2	5.3 7	7345.6	27⁻	6564.5	25⁻	Q	Mult.: DCO=1.02 9.

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E$_\gamma$ [†]	I$_\gamma$ [†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult. [‡]	Comments
792.8 2	1.3 2	8243.7	28−	7450.9	26−	Q	Mult.: DCO=1.78 25, gating on ΔJ=1 transition.
795.0 5	<0.5	8200.5	27−	7405.5	25−	Q	Mult.: DCO=0.92 11.
795.2 5	<0.5	7439.0	26−	6643.8	24−	Q	Mult.: DCO=1.09 12.
795.5 5	0.6 1	7423.0	26−	6627.5	24−		
796.5 5	<0.5	8036.9	27−	7240.4	25−		
799 1	<0.5	9385.0	31−	8586.0	29−		
800.8 5	<0.5	4577.4	18−	3776.6	16−		
800.9 2	1.1 2	6689.1	23+	5888.2	21+	Q	Mult.: DCO=1.15 12.
807.8 5	<0.5	8844.7	29−	8036.9	27−	Q	Mult.: DCO=0.91 11.
811.1 [#]		811.1+y	J2+2	0.0+y	J2≈(28)		
811.5 5	<0.5	7439.0	26−	6627.5	24−	Q	Mult.: DCO=1.02 10.
812.2 2	13 2	6686.6	26+	5874.2	24+		
813.3 5	0.5 1	7705.0	27−	6891.8	25−	Q	Mult.: DCO=0.90 13.
815.8 5	0.6 1	9660.5	31−	8844.7	29−	Q	Mult.: DCO=0.95 14.
817.0 5	<0.5	2552.1	10−	1735.1	10+		
817.98 [ad] 7		942.01?	0+	124.03	2+		
824.0 5	0.6 1	8619.4	28−	7795.4	26−	Q	Mult.: DCO=1.33 20, gating on ΔJ=1 transition.
824.1 [#]	0.96 7	2993.9+x	J1+8	2169.8+x	J1+6	Q [b]	DCO=1.12 10
824.2 [d] 5	<0.5	5145.4	(19−)	4321.2	18+		
827.0 5	<0.5	3816.5	15−	2989.5	14+		
827.2 2	1.2 3	8664.7	29−	7837.5	27−		
829.9 2	1.1 2	7519.0	25+	6689.1	23+		
831.4 2	1.7 2	7860.0	28−	7028.6	26−	Q	Mult.: DCO=1.02 10.
834.5 5	<0.5	7918.1	27−	7083.6	25−		
840.1 2	1.5 2	5888.2	21+	5048.1	20+	Q(+D)	Mult.: DCO=0.93 13; interpreted by authors As D+Q ΔJ=1.
843.6 5	<0.5	4466.6	15−	3623.0	16+	D	Mult.: DCO=1.08 12, gating on ΔJ=1 transition.
846 1	0.9 1	8365.0	(27+)	7519.0	25+		
846.5 2	1.4 2	5167.7	19+	4321.2	18+	Q(+D)	Mult.: DCO=0.91 13; interpreted by authors As D+Q ΔJ=1.
846.7 5	<0.5	8269.7	28−	7423.0	26−	Q	Mult.: DCO=1.02 16.
850.7 2	5.6 8	8196.3	29−	7345.6	27−	Q	Mult.: DCO=0.93 8.
852.0 5	<0.5	9052.5	29−	8200.5	27−		
853.0 2	6.2 7	2066.0	9−	1212.7	8+	D	Mult.: DCO=0.80 8.
854.7 5	<0.5	4295.8	15−	3441.1	15−		
856.4 2	1.5 2	8116.1	28+	7259.9	26+		
857.7 5	0.8 1	9101.4	30−	8243.7	28−		
862.2 [#]	0.98 [@] 13	1673.3+y	J2+4	811.1+y	J2+2		
869.4 5	0.5 1	10529.9	33−	9660.5	31−	Q	Mult.: DCO=1.02 7.
874.8 2	8.0 9	7561.5	28+	6686.6	26+		
875.95 [ad] 9		875.89?	2+	0.0	0+		
877.0 5	<0.5	5212.2	20−	4335.2	18−	Q	Mult.: DCO=1.06 8.
877.3 [#]	0.89 [@] 7	3871.2+x	J1+10	2993.9+x	J1+8		
881.0 5	<0.5	9500.4	30−	8619.4	28−		
888.5 5	<0.5	8593.5	29−	7705.0	27−		
890.1 5	<0.5	8329.1	28−	7439.0	26−	Q	Mult.: DCO=0.94 9.
890.9 2	1.4 2	9555.6	31−	8664.7	29−	Q	Mult.: DCO=0.90 11.
892.9 5	0.5 1	8811.0	29−	7918.1	27−	(Q)	Mult.: DCO=1.15 15.
901.2 5	<0.5	5477.8	21−	4576.7	19−	Q	Mult.: DCO=1.04 13.
901.6 2	1.0 2	8761.6	30−	7860.0	28−	Q	Mult.: DCO=1.03 8.
903.6 5	<0.5	9173.3	30−	8269.7	28−	(Q)	Mult.: DCO=0.89 13.

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
906.7 *5*	0.6 *1*	11436.6	35⁻	10529.9	33⁻	Q	Mult.: DCO=0.93 *10*.
906.81[ad] *7*		1030.84?	3⁺	124.03	2⁺		
909	<0.5	9961.5	31⁻	9052.5	29⁻		
910.3[#]	1.00[@] *8*	2583.6+y	J2+6	1673.3+y	J2+4		
916.7 *2*	2.6 *4*	9113.0	31⁻	8196.3	29⁻	Q	Mult.: DCO=0.99 *9*.
923.0 *2*	1.3 *2*	10024.4	32⁻	9101.4	30⁻		
923.9 *2*	1.5 *2*	9039.9	30⁺	8116.1	28⁺		
926.9 *2*	1.4 *2*	6689.1	23⁺	5762.1	22⁺	Q(+D)	Mult.: DCO=0.83 *18*.
931.4[#]	0.75[@] *7*	4802.6+x	J1+12	3871.2+x	J1+10		
933.0 *5*	<0.5	9262.1	30⁻	8329.1	28⁻	Q	Mult.: DCO=0.99 *11*.
934.51[ad] *10*		1058.57?	2⁺	124.03	2⁺		
937.6 *5*	<0.5	9748.6	31⁻	8811.0	29⁻		
938 *1*	<0.5	10438.4	32⁻	9500.4	30⁻		
938.8 *2*	4.1 *5*	8500.3	30⁺	7561.5	28⁺		
942.0 *2*	1.0 *1*	2154.7	8⁻	1212.7	8⁺	(D)	Mult.: DCO=1.06 *11*. Consistent with Q ΔJ=2 or D ΔJ=0; interpreted As the latter by 2009Ya21.
947.0 *5*	0.5 *1*	12383.6	37⁻	11436.6	35⁻	Q	Mult.: DCO=1.06 *11*.
953.4 *5*	<0.5	6149.5	23⁻	5196.2	21⁻	Q	Mult.: DCO=0.91 *9*.
957.0 *5*	0.9 *1*	10512.6	33⁻	9555.6	31⁻		
958.1 *5*	<0.5	9551.6	31⁻	8593.5	29⁻	(Q)	Mult.: DCO=0.91 *11*.
958.3 *5*	<0.5	10131.6	32⁻	9173.3	30⁻	Q	Mult.: DCO=0.90 *8*.
959.8 *5*	<0.5	5893.0	22⁻	4933.2	20⁻		
960.6[#]	0.89[@] *10*	3544.2+y	J2+8	2583.6+y	J2+6		
964 *1*	<0.5	10226.1	32⁻	9262.1	30⁻		
968.4 *5*	0.7 *1*	9730.0	32⁻	8761.6	30⁻	Q	Mult.: DCO=1.02 *10*.
970.4 *5*	<0.5	2705.5	10⁻	1735.1	10⁺		Mult.: DCO=0.87 *13*.
976.2 *2*	1.1 *1*	10016.1	32⁺	9039.9	30⁺		
976.5 *2*	1.7 *3*	10089.5	33⁻	9113.0	31⁻	Q	Mult.: DCO=0.99 *9*.
978.0 *2*	5.0 *5*	1734.4	7⁻	756.4	6⁺		
980.0 *2*	3.3 *4*	2192.7	8⁻	1212.7	8⁺	D	Mult.: DCO=0.84 *10*.
982.9 *5*	<0.5	3288.0	13⁻	2305.1	12⁺	D	Mult.: DCO=0.74 *10*.
984.4[#]	0.66[@] *8*	5787+x	J1+14	4802.6+x	J1+12		
986.3 *2*	1.4 *2*	11010.7	34⁻	10024.4	32⁻		
990.0 *5*	<0.5	13373.6	39⁻	12383.6	37⁻	Q	Mult.: DCO=1.05 *12*.
999.7 *2*	2.7 *4*	9500.0	32⁺	8500.3	30⁺		
1000[&]		1385.3	(5⁺)	385.33	4⁺		
1007 *1*	<0.5	10755.6	33⁻	9748.6	31⁻	Q	Mult.: DCO=1.11 *16*.
1007.2 *5*	<0.5	11138.8	34⁻	10131.6	32⁻	Q	Mult.: DCO=0.89 *11*.
1012.0[d] *5*	<0.5	4321.2	18⁺	3309.4	16⁺		
1015 *1*	<0.5	10566.6	33⁻	9551.6	31⁻	Q	Mult.: DCO=0.94 *11*.
1016.6[#]	0.89[@] *12*	4560.8+y	J2+10	3544.2+y	J2+8		
1017.6 *5*	<0.5	6891.8	25⁻	5874.2	24⁺		Mult.: DCO=1.06 *10*. inconsistent with pure D ΔJ=1, but level scheme implies E1 ΔJ=1.
1018.3 *5*	<0.5	7705.0	27⁻	6686.6	26⁺		Mult.: DCO=0.89 *10*. inconsistent with pure D ΔJ=1, but level scheme implies E1 ΔJ=1.
1019.5 *2*	1.0 *2*	11532.1	35⁻	10512.6	33⁻		
1025.5 *5*	<0.5	10755.5	34⁻	9730.0	32⁻	Q	Mult.: DCO=1.14 *14*.
1026.2 *5*	0.6 *1*	11042.3	34⁺	10016.1	32⁺		
1026.3 *5*	<0.5	6149.5	23⁻	5123.0	22⁺		
1027.0 *2*	1.4 *2*	11116.5	35⁻	10089.5	33⁻	Q	Mult.: DCO=1.06 *7*.
1039.0 *5*	<0.5	5477.8	21⁻	4438.8	20⁺		

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$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)

$\gamma(^{168}Hf)$ (continued)

E_γ [†]	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	Mult. [‡]	Comments
1040.5 *5*	<0.5	14414.1	41⁻	13373.6	39⁻	Q	Mult.: DCO=0.98 *14*.
1041.4[#]	0.54[@] *10*	6828+x	J1+16	5787+x	J1+14		
1047 *1*	<0.5	12185.8	36⁻	11138.8	34⁻		
1050.7 *2*	1.6 *3*	10550.7	34⁺	9500.0	32⁺		
1056.3 *2*	2.2 *3*	1812.7	6⁻	756.4	6⁺		Mult.: DCO=0.89 *15*.
1058 *1*	0.6 *1*	12068.4	36⁻	11010.7	34⁻		
1058.60[ad] *10*		1058.57?	2⁺	0.0	0⁺		
1059 *1*	0.5 *1*	12101.3	36⁺	11042.3	34⁺		
1061.5 *2*	1.1 *2*	12178.0	37⁻	11116.5	35⁻	Q	Mult.: DCO=1.09 *10*.
1072.2 *5*	<0.5	11827.7	36⁻	10755.5	34⁻	Q	Mult.: DCO=0.96 *12*.
1075.0[#]	0.67[@] *10*	5635.8+y	J2+12	4560.8+y	J2+10		
1076.2 *5*	0.5 *1*	13254.2	39⁻	12178.0	37⁻	Q	Mult.: DCO=0.96 *12*.
1086 *1*	<0.5	12618.2	37⁻	11532.1	35⁻		
1086.8 *2*	1.0 *2*	11637.6	36⁺	10550.7	34⁺		
1087.2 *5*	0.5 *1*	14341.4	41⁻	13254.2	39⁻		
1097.2 *5*	<0.5	15511.3	43⁻	14414.1	41⁻	Q	Mult.: DCO=0.95 *13*.
1097.4[#]	0.34[@] *9*	7926+x	J1+18	6828+x	J1+16		
1103.1 *5*	<0.5	12930.8	38⁻	11827.7	36⁻	Q	Mult.: DCO=1.02 *10*.
1104.7 *5*	0.7 *1*	12742.3	38⁺	11637.6	36⁺		
1107 *1*	<0.5	14037.9	40⁻	12930.8	38⁻	Q	Mult.: DCO=0.99 *12*.
1107.8 *2*	1.7 *3*	2320.5	9⁻	1212.7	8⁺	D	Mult.: DCO=0.65 *8*.
1108.8 *5*	0.7 *1*	13851.1	40⁺	12742.3	38⁺		
1111.6 *2*	1.5 *2*	1496.9	4⁻	385.33	4⁺		Mult.: DCO=0.88 *12*.
1116.4 *5*	0.7 *2*	2851.4	11⁻	1735.1	10⁺	D	Mult.: DCO=0.75 *10*.
1119.1 *5*	<0.5	15460.5	43⁻	14341.4	41⁻	Q	Mult.: DCO=1.04 *12*.
1120.5 *5*	0.8 *1*	14971.6	42⁺	13851.1	40⁺		
1135.6[#]	0.37[@] *12*	6771+y	J2+14	5635.8+y	J2+12		
1140.0 *5*	<0.5	4449.3	15⁻	3309.4	16⁺	D	Mult.: DCO=0.98 *14*, gating on ΔJ=1 transition.
1153.5[#]	0.23[@] *10*	9079+x	J1+20	7926+x	J1+18		
1155.5 *2*	1.0 *2*	16127.1	44⁺	14971.6	42⁺		
1158.0 *5*	<0.5	16669.3	45⁻	15511.3	43⁻		
1160.5[ad] *1*		1284.53?	4⁺	124.03	2⁺		
1165[&]		1549.9	(6⁺)	385.33	4⁺		
1171.2 *5*	<0.5	16631.7	45⁻	15460.5	43⁻	Q	Mult.: DCO=1.03 *9*.
1195[#d]		7966+y?	J2+16	6771+y	J2+14		
1209.1 *5*	0.8 *1*	17336.2	46⁺	16127.1	44⁺		
1215[#d]		10294+x?	J1+22	9079+x	J1+20		
1220.8 *5*	<0.5	17890.1	47⁻	16669.3	45⁻		
1234 *1*	<0.5	17865.7	47⁻	16631.7	45⁻		
1235.4 *2*	1.2 *2*	1991.8	6⁻	756.4	6⁺	(D)	Mult.: DCO=0.85 *11*.
1256[#d]		9222+y?	J2+18	7966+y?	J2+16		
1269	0.7 *1*	18605.2	48⁺	17336.2	46⁺		
1273[#d]		11567+x?	J1+24	10294+x?	J1+22		
1285 *1*	<0.5	19175.1	49⁻	17890.1	47⁻		
1305.3 *5*	<0.5	4614.6	16⁻	3309.4	16⁺		
1306.3 *5*	<0.5	4295.8	15⁻	2989.5	14⁺	D	Mult.: DCO=0.90 *10*, gating on ΔJ=1 transition.
1323.4 *2*	1.0 *2*	5762.1	22⁺	4438.8	20⁺		
1324.0 *5*	0.9 *2*	2080.4	7⁻	756.4	6⁺	D	Mult.: DCO=0.72 *9*.
1336.5 *5*	<0.5	5167.7	19⁺	3831.4	18⁺		
1350.2 *5*	<0.5	8036.9	27⁻	6686.6	26⁺		
1357.3 *2*	1.1 *1*	6480.3	24⁺	5123.0	22⁺	Q	Mult.: DCO=1.02 *17*.

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^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02 (continued)

γ(^{168}Hf) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
1366.3 *5*	<0.5	7240.4	25⁻	5874.2	24⁺	D	Mult.: DCO=0.69 *10*.
1371.1 *5*	<0.5	6494.2	23⁻	5123.0	22⁺	D	Mult.: DCO=0.49 *9*.
1385.5 *5*	0.7 *1*	7259.9	26⁺	5874.2	24⁺	Q	Mult.: DCO=0.94 *12*.
1387.6[d] *5*	<0.5	8074.3	27⁻	6686.6	26⁺		
1429.3 *5*	<0.5	8116.1	28⁺	6686.6	26⁺		
1439.4 *5*	<0.5	4295.8	15⁻	2856.4	14⁺		
1459.8 *5*	<0.5	4449.3	15⁻	2989.5	14⁺		
1477.6 *5*	<0.5	9039.9	30⁺	7561.5	28⁺		
1592.9 *5*	<0.5	4449.3	15⁻	2856.4	14⁺		
1610.2 *5*	1.0 *2*	4466.6	15⁻	2856.4	14⁺	D	Mult.: DCO=0.93 *15*, gating on ΔJ=1 transition.

† From 2009Ya21, except As noted. the evaluator has assigned an uncertainty of 1 keV to Eγ values that 2009Ya21 quote to only the nearest keV. Iγ is relative to I(261γ), except As noted.

‡ From DCO ratios (2009Ya21 unless noted to the contrary). The gating transitions were stretched Q except As noted, and expected ratios are≈1.0 and≈0.6 , respectively, for stretched Q and pure stretched D transitions (2009Ya21) when gating on a stretched Q G.

From 2001Am02.

@ Relative intensity within band. The values were read (by evaluator) from the intensity plots given by 2001Am02.

& From level scheme In fig. 1 of 2009Ya21; not included In table AI. transition reported by 2009Ya21 alone, so clearly it must have been observed In that study.

a From Adopted Gammas. Eγ given to nearest keV In fig. 1 of 2009Ya21 but transition is not included In table AI. an email communication between the evaluator and one of the authors of 2009Ya21 (W. Ma) confirms that this γ was too weak to observe In their study (which emphasized population of high spin states) and was included In the level drawing for completeness only. γ not attributed to this reaction In Adopted Levels, Gammas.

b Based on DCO ratio communicated in email from first author of 2008Ya20 (R.B. Yadav) to B. Singh on 28 Oct. 2008. These values are obtained using stretched Q gating transitions.

c Multiply placed with undivided intensity.

d Placement of transition in the level scheme is uncertain.

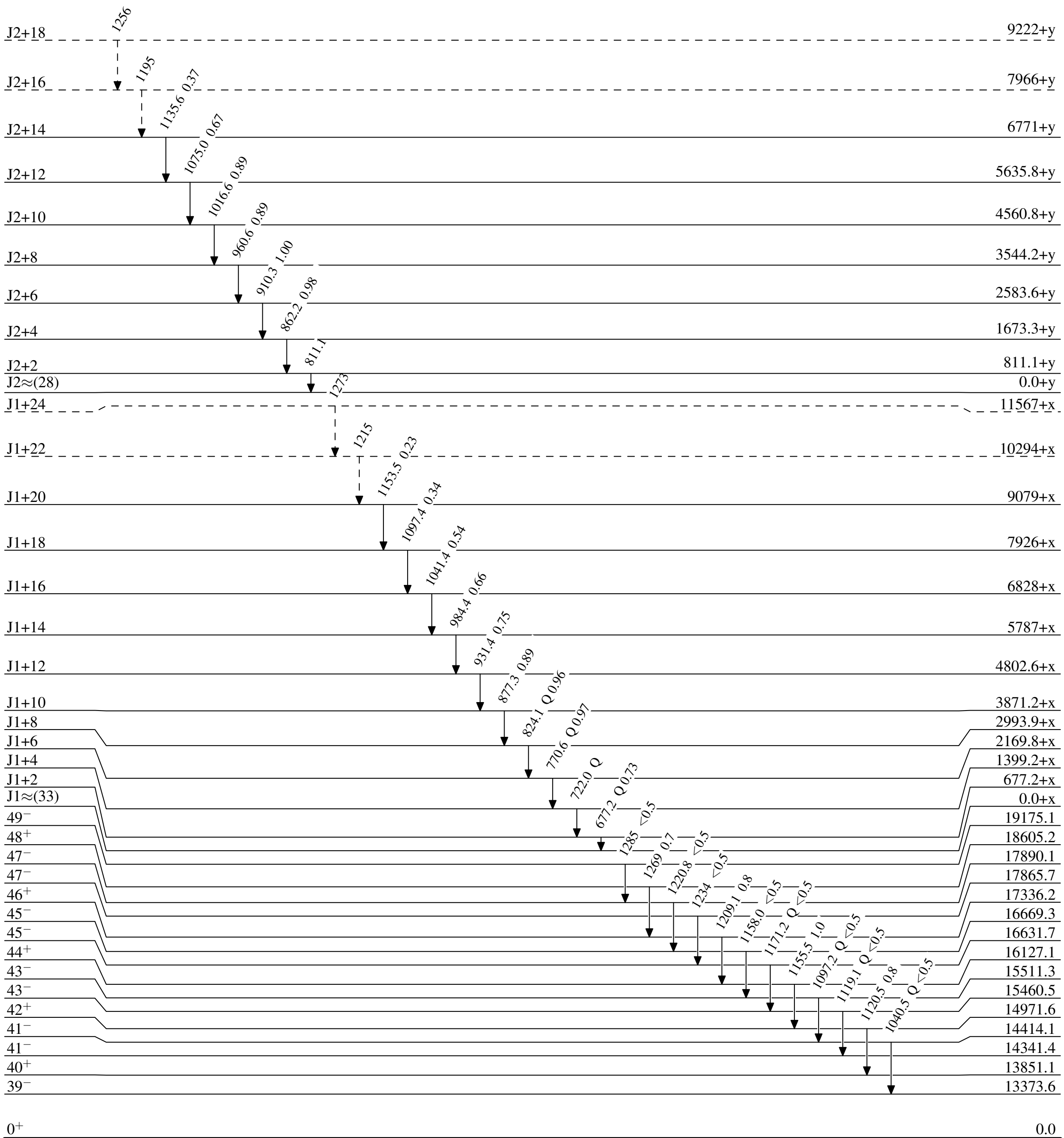
$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.

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)



$^{168}_{72}Hf_{96}$

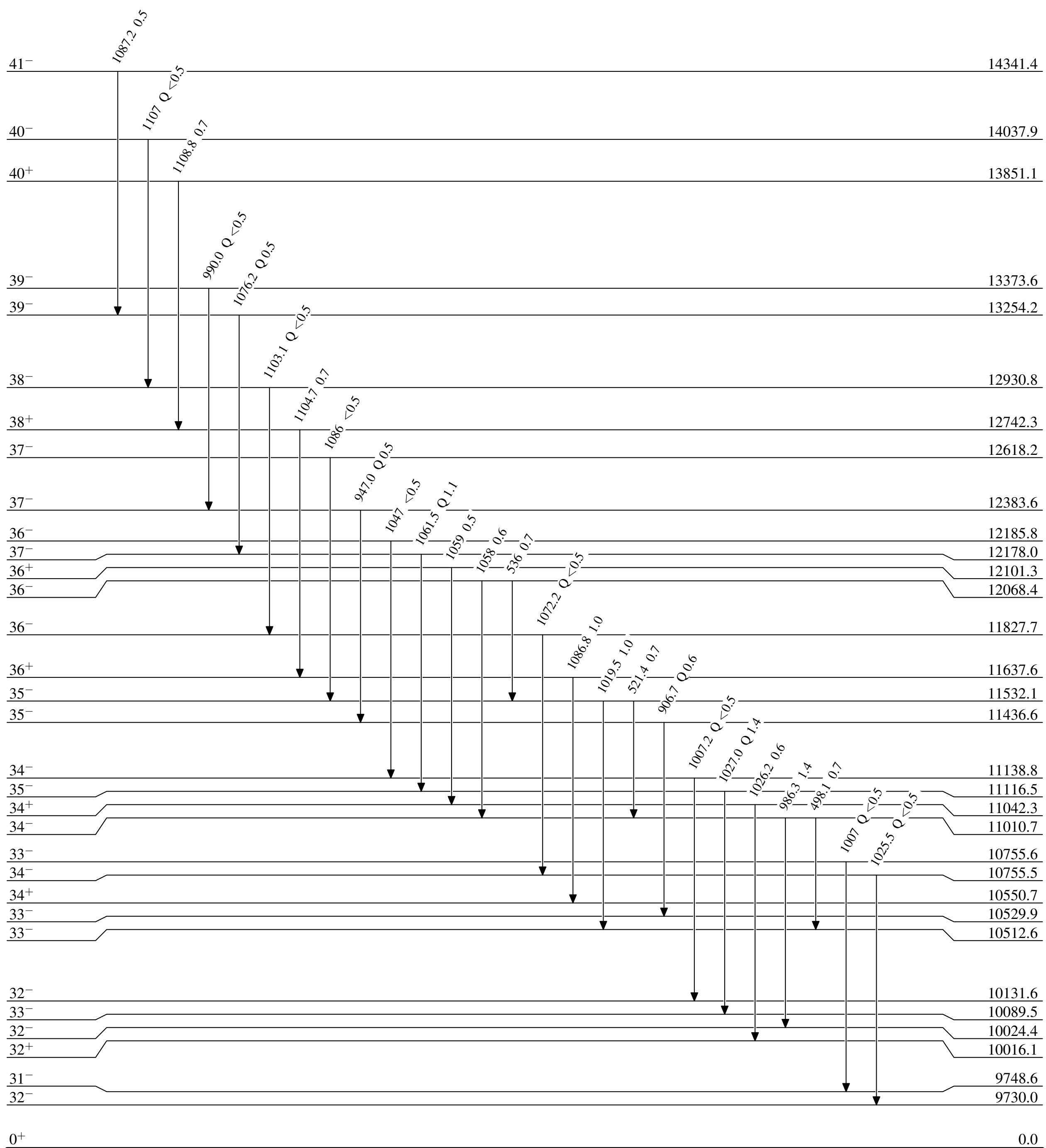
$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Legend

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

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.

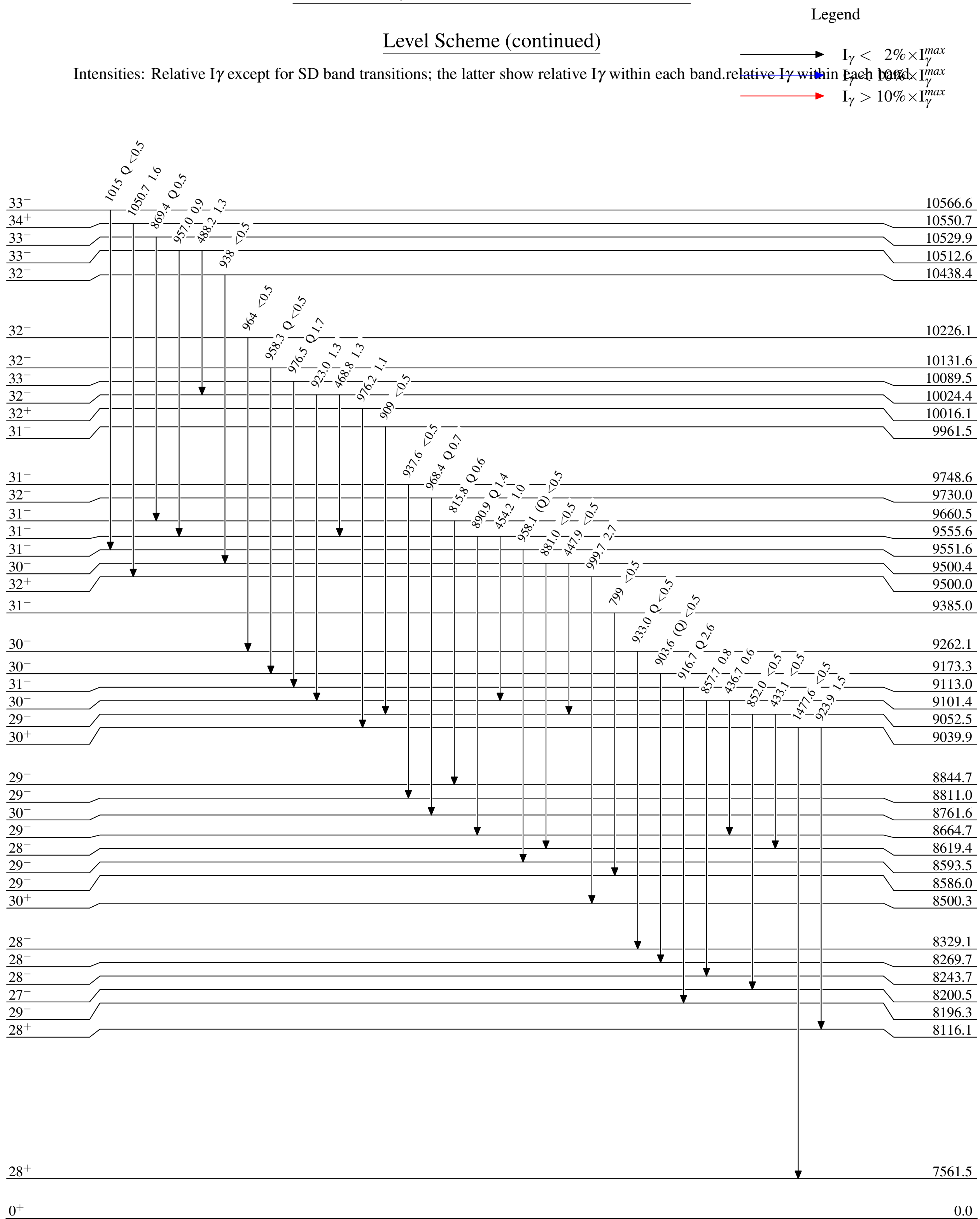


$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.

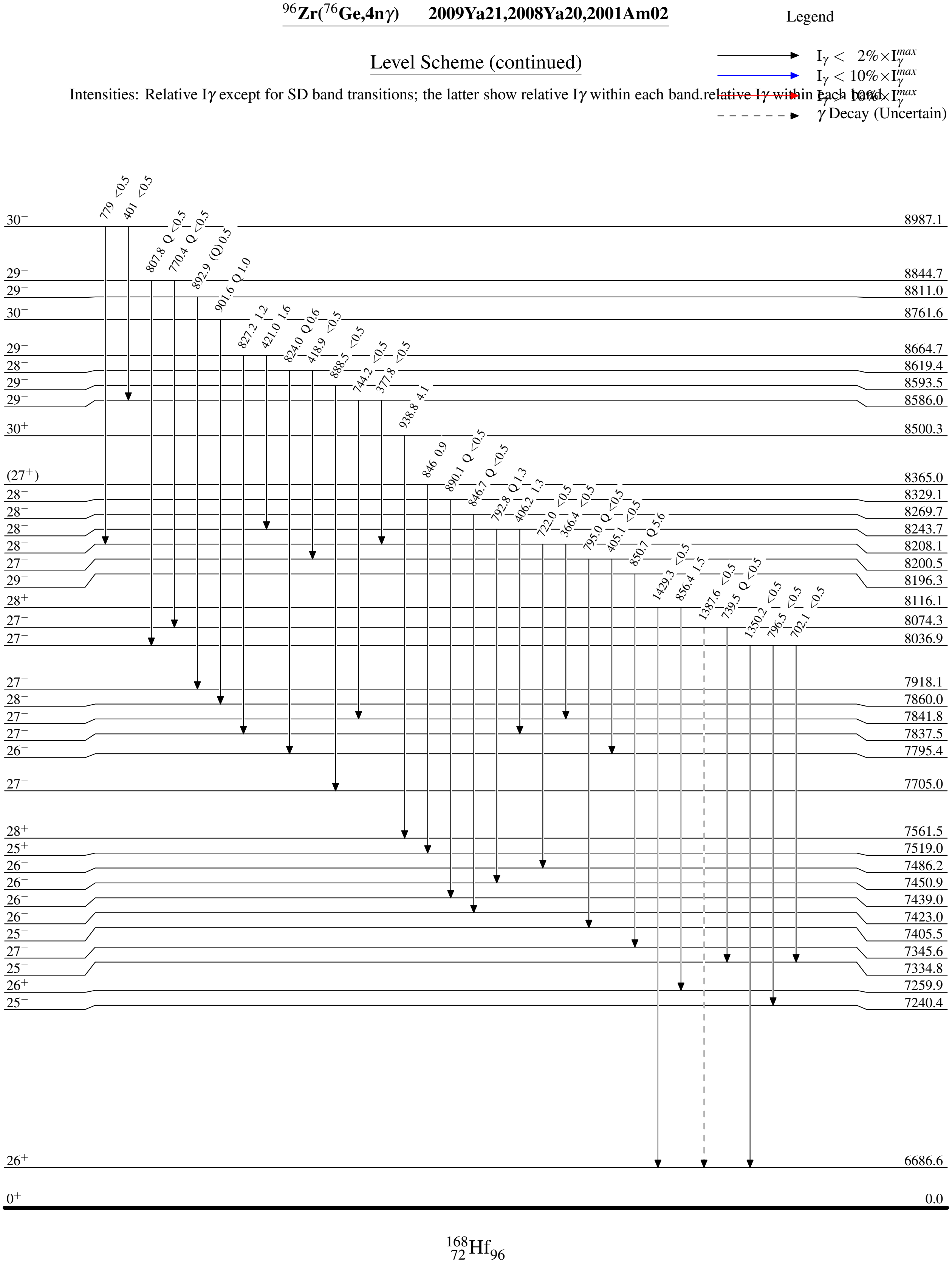


$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

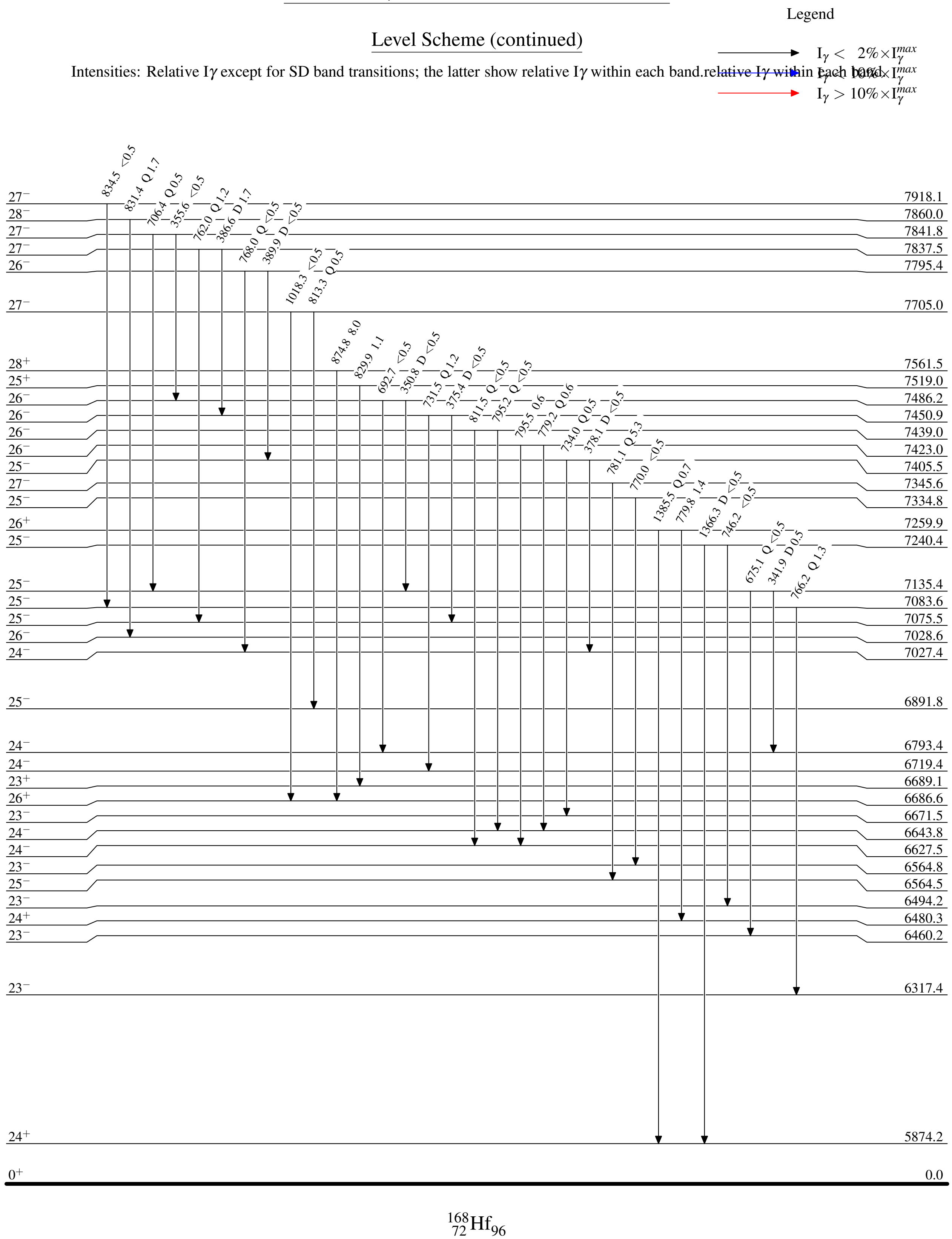
Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.



$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.



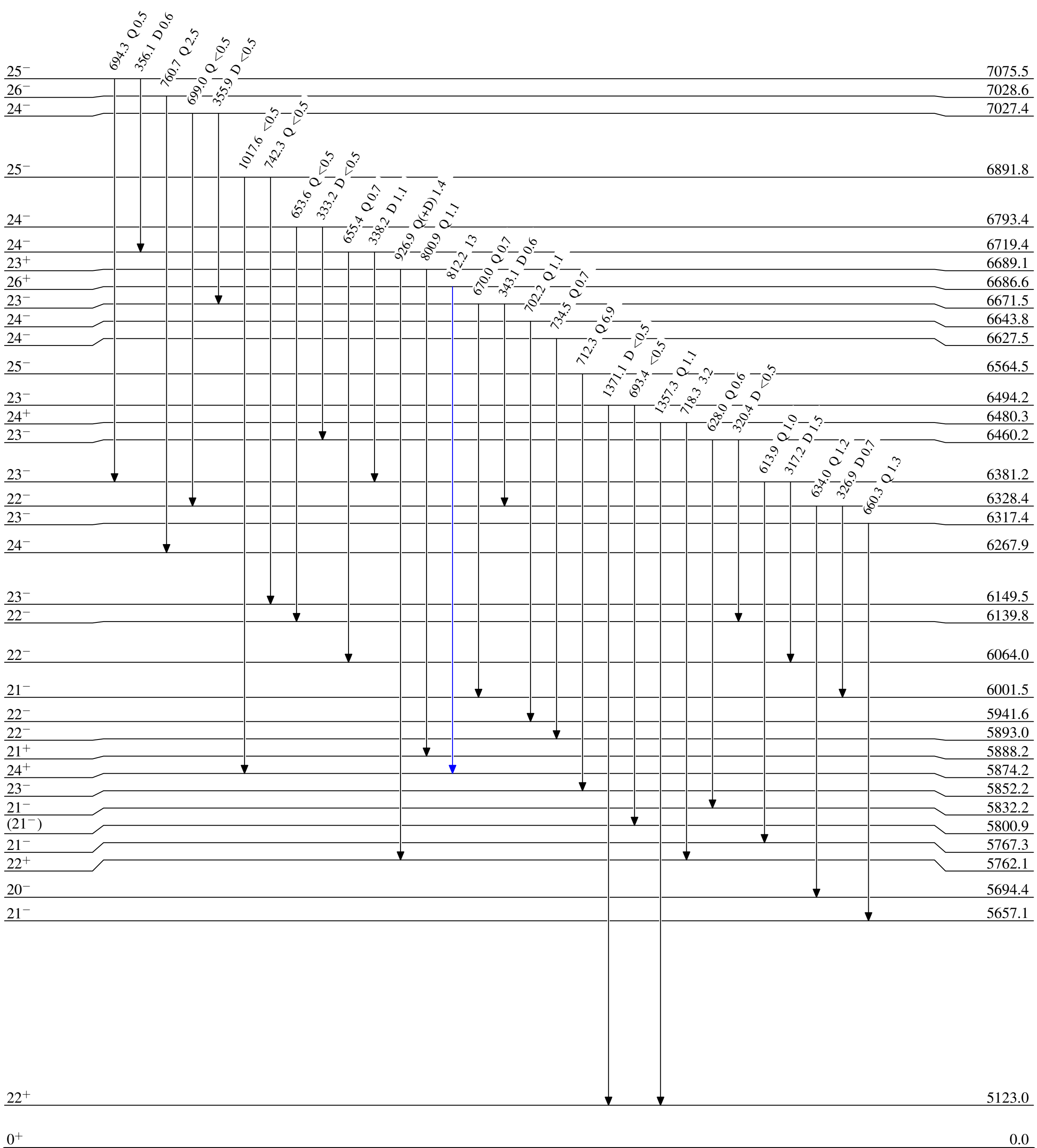
$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Legend

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.

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



$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

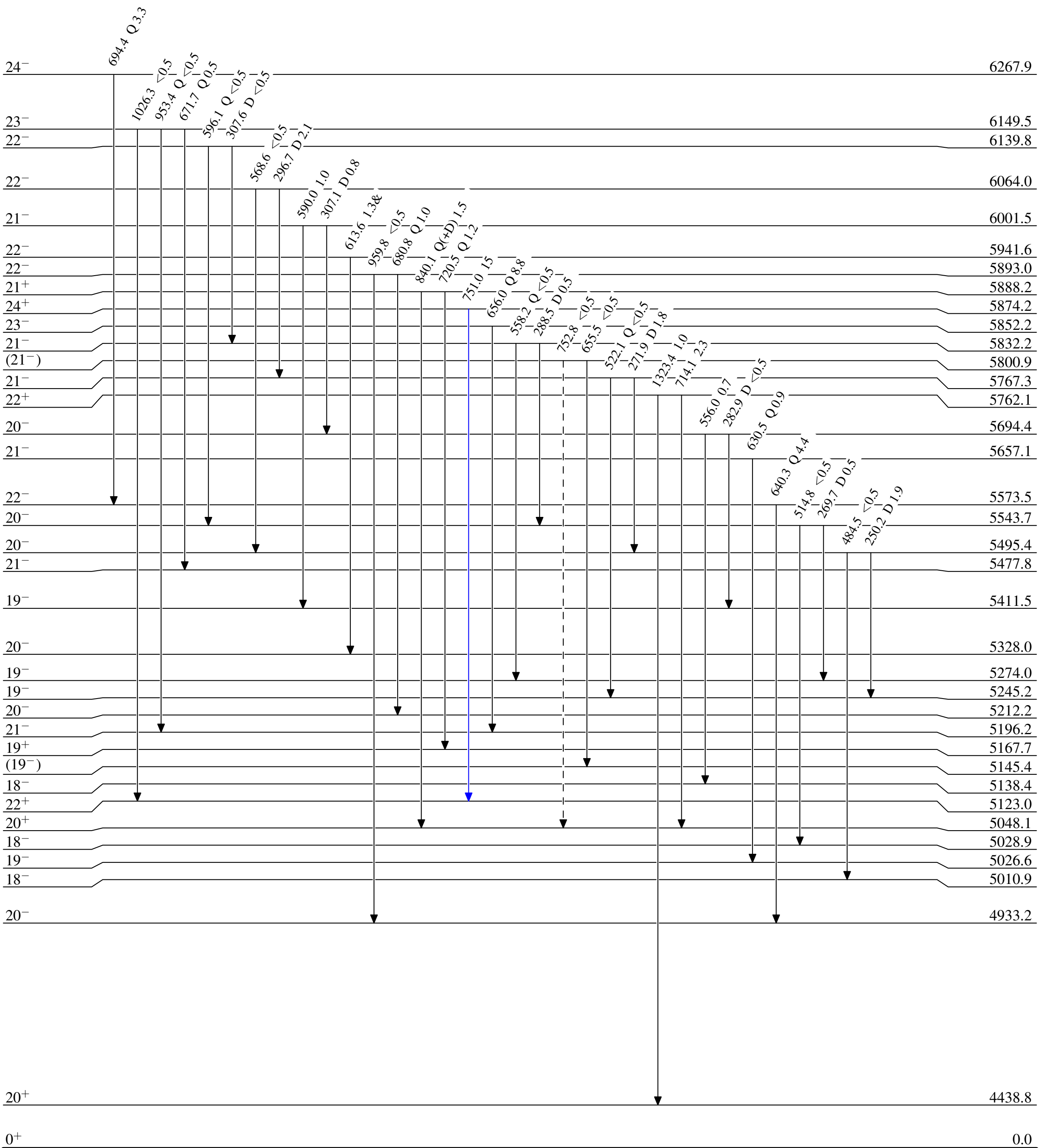
Legend

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.

& Multiply placed: undivided intensity given

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



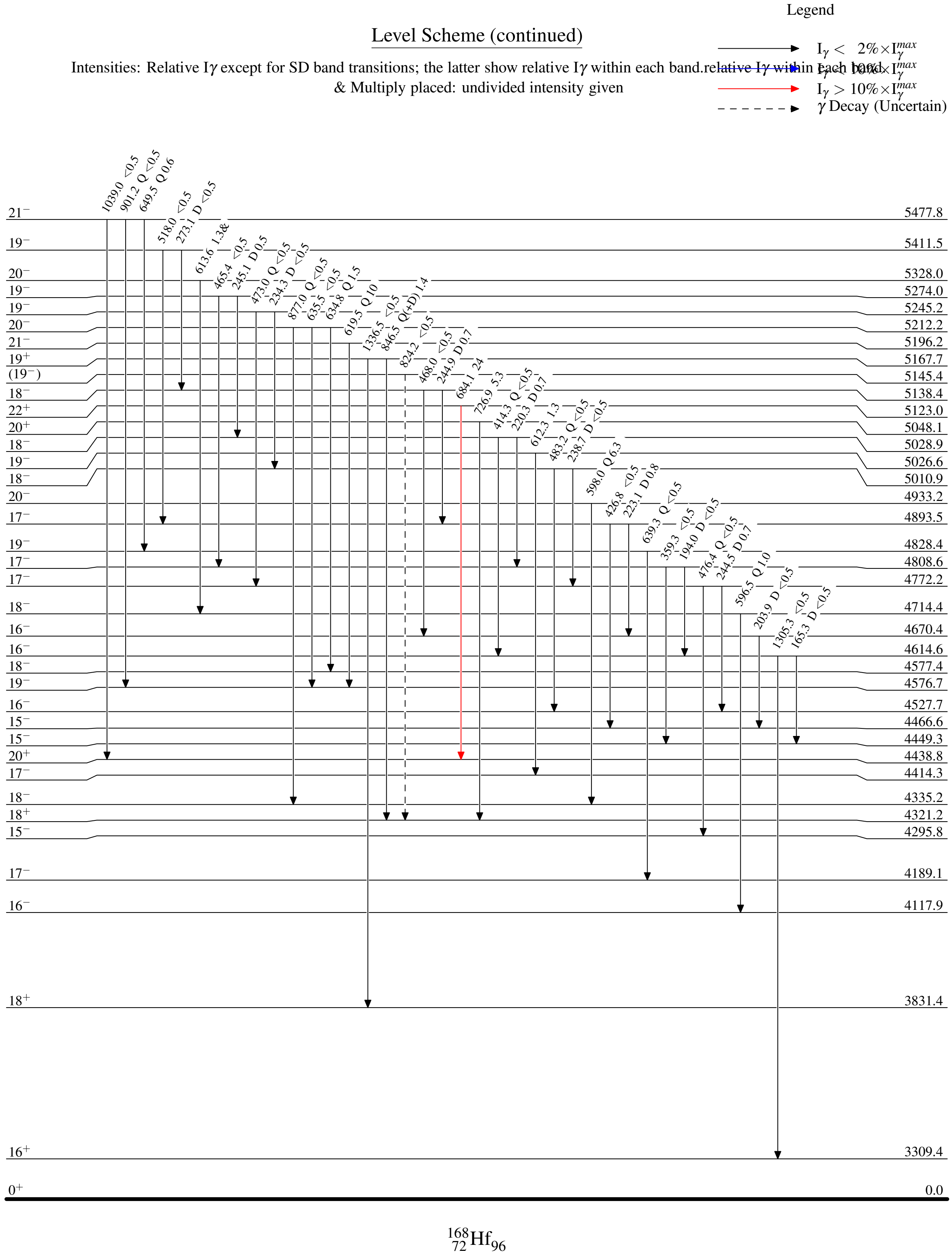
$^{168}_{72}Hf_{96}$

^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.

& Multiply placed: undivided intensity given



^{96}Zr(^{76}Ge,4nγ) 2009Ya21,2008Ya20,2001Am02

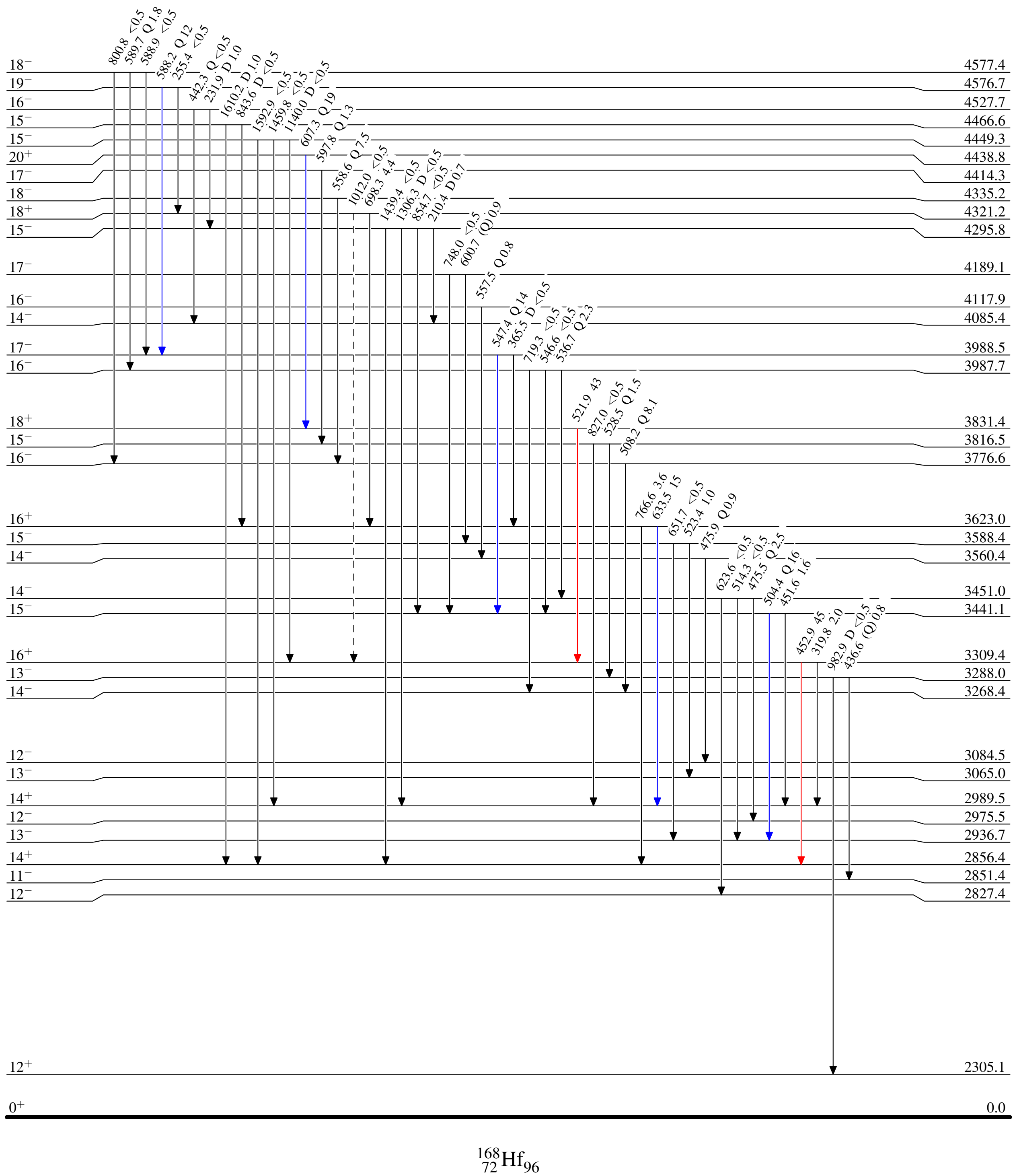
Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.

& Multiply placed: undivided intensity given

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)

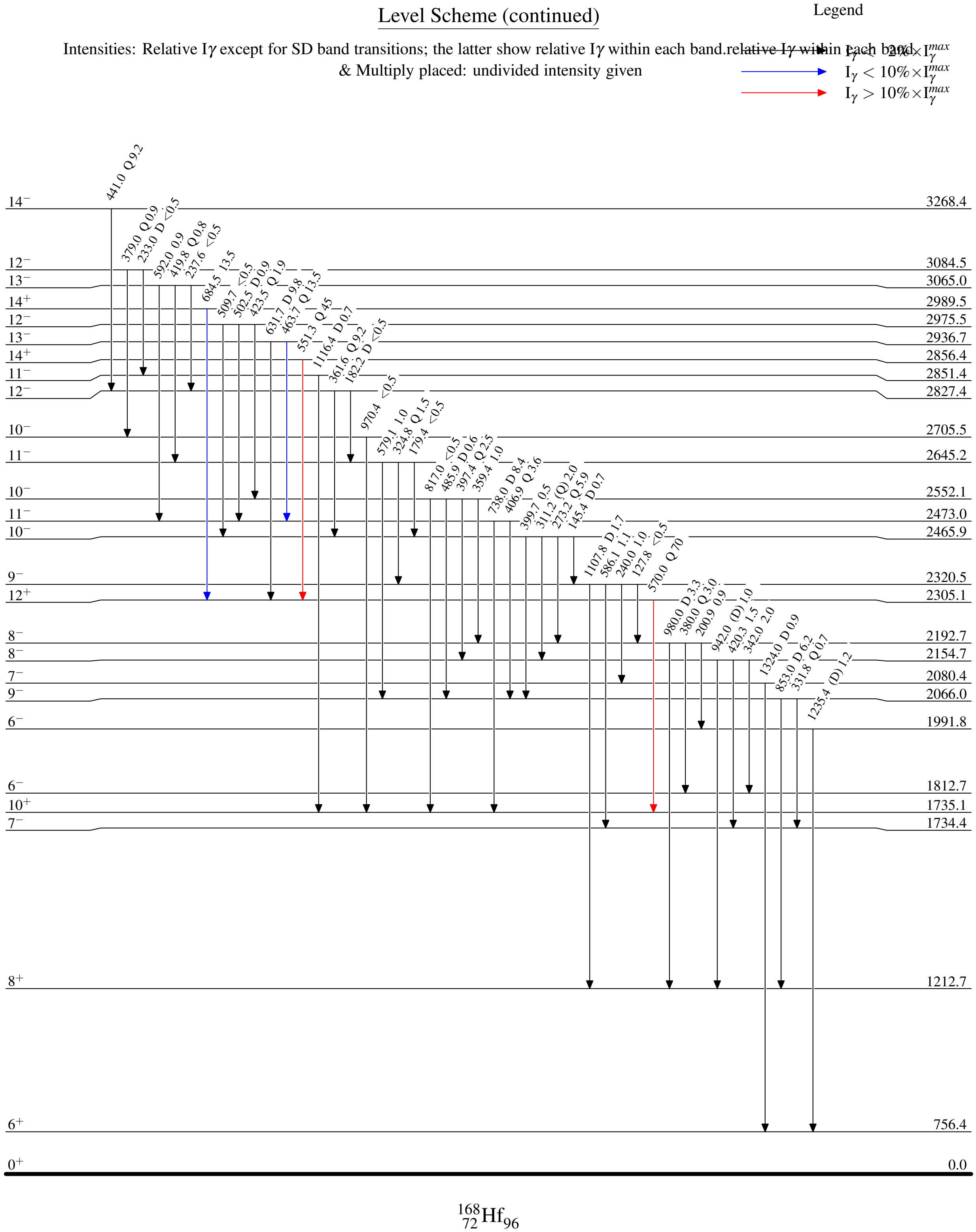


$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.

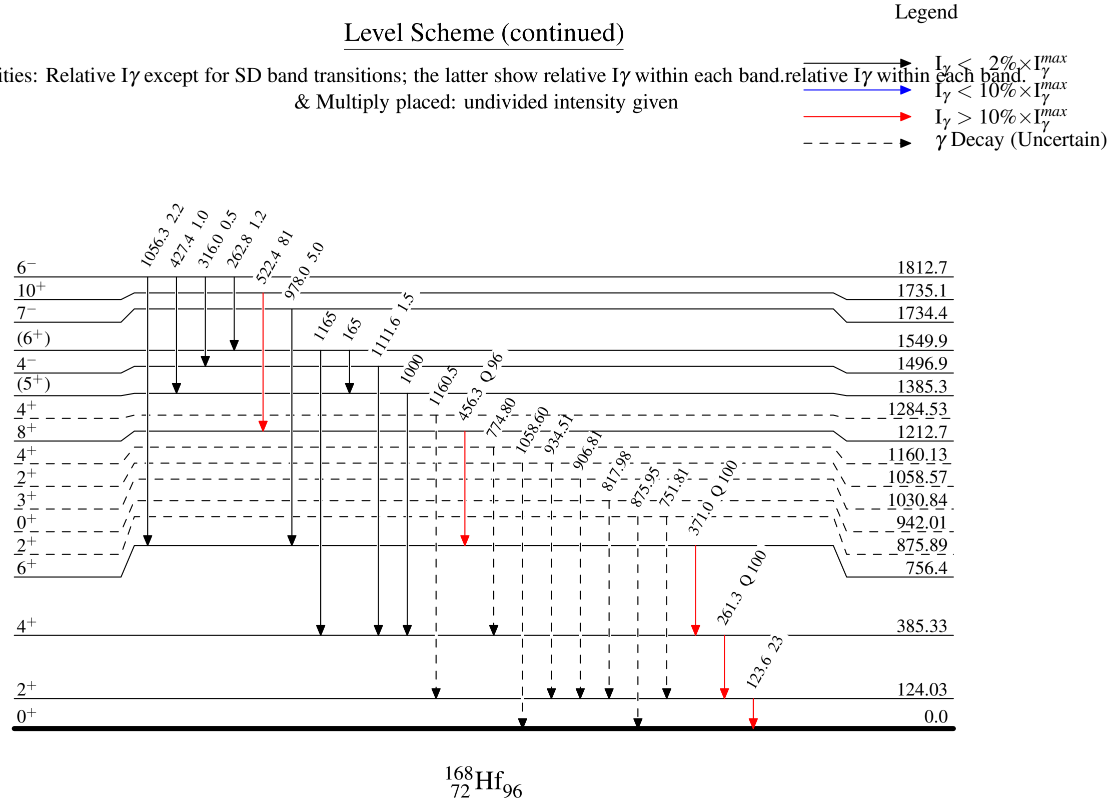
& Multiply placed: undivided intensity given



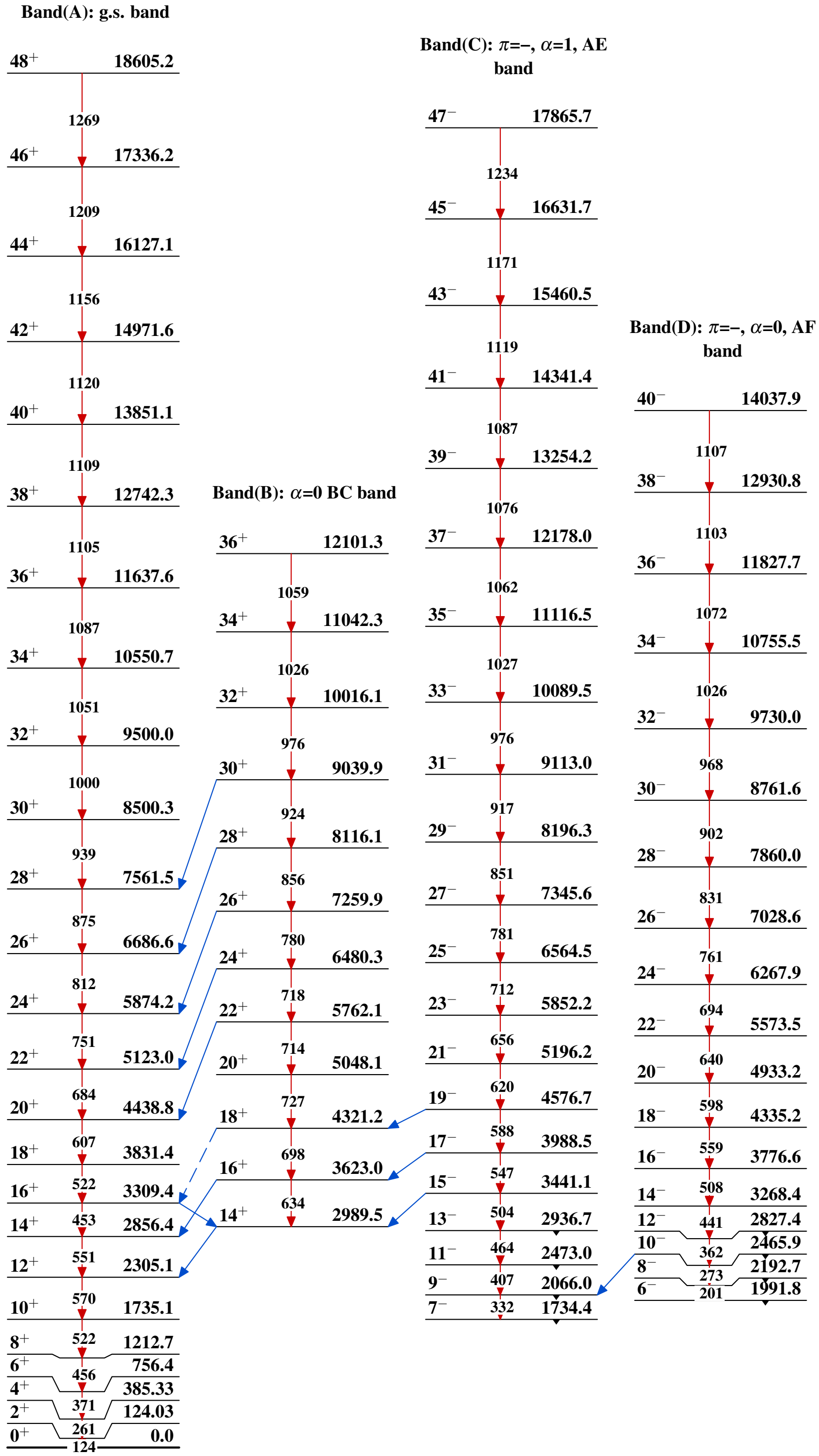
$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02

Level Scheme (continued)

Intensities: Relative Iγ except for SD band transitions; the latter show relative Iγ within each band.relative Iγ within each band.
& Multiply placed: undivided intensity given

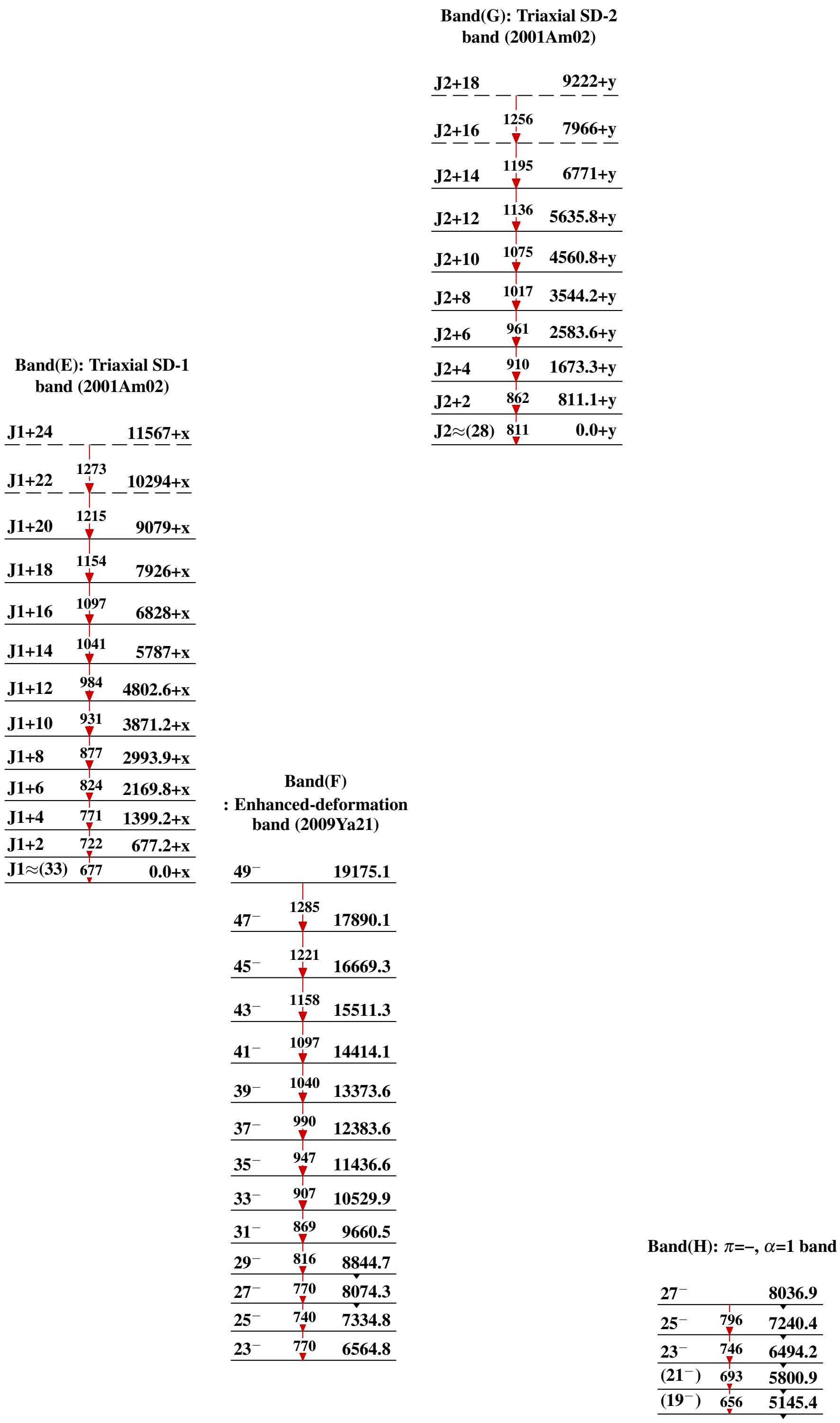


$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02



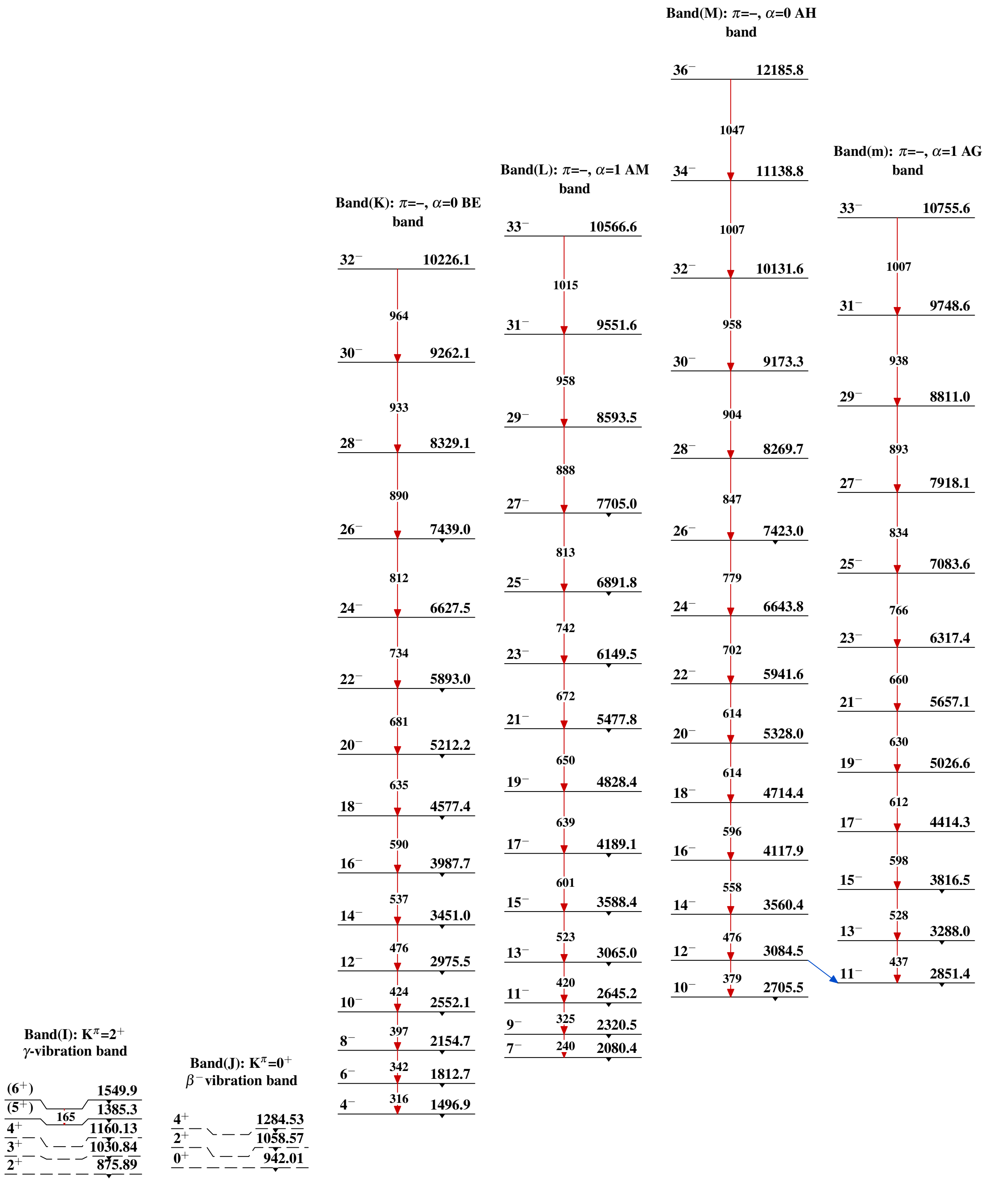
$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)



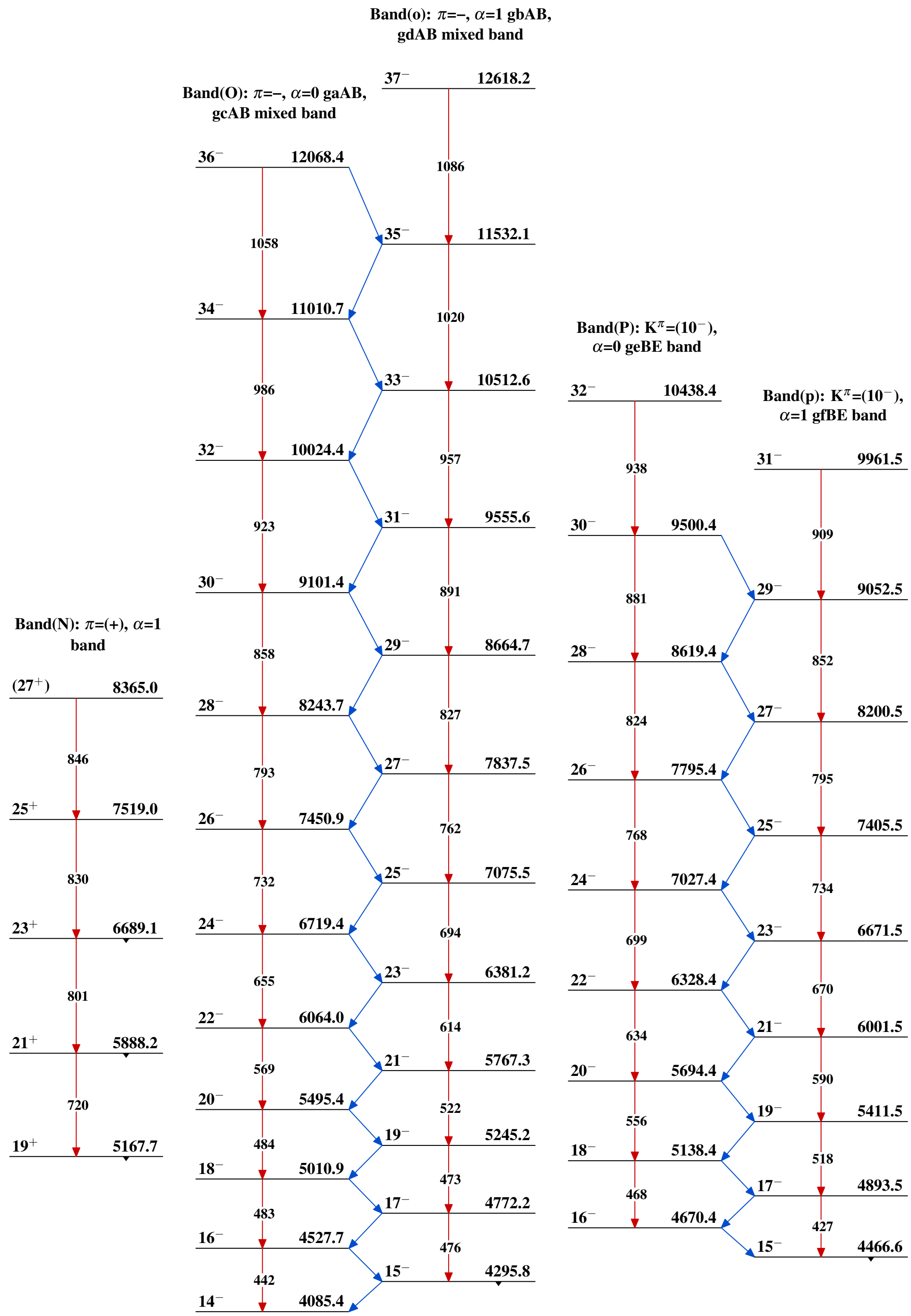
$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)



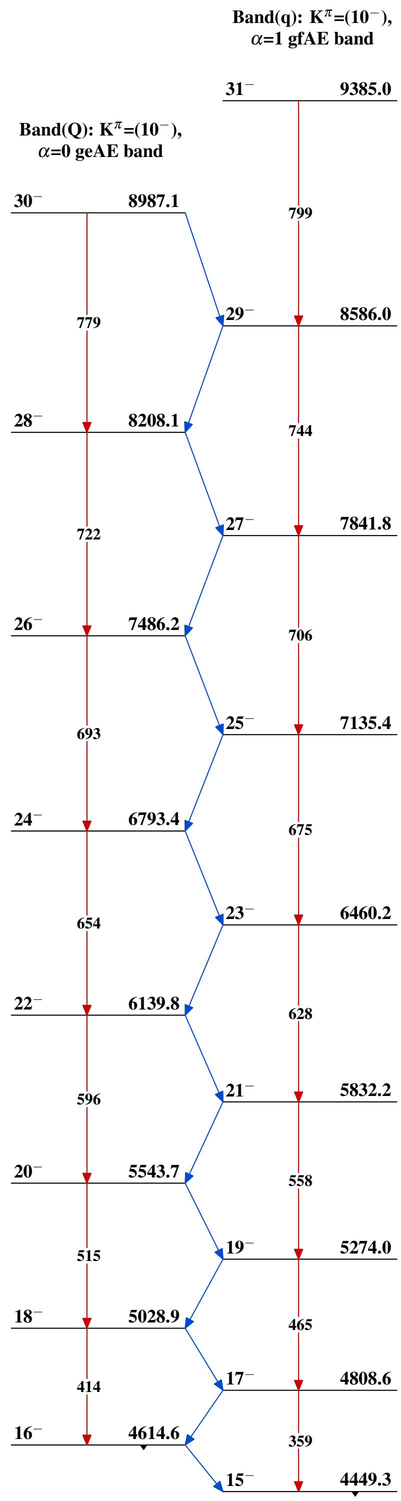
$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)



$^{168}_{72}Hf_{96}$

$^{96}Zr(^{76}Ge,4n\gamma)$ 2009Ya21,2008Ya20,2001Am02 (continued)



$^{168}_{72}Hf_{96}$