Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 146, 1 (2017)	30-Sep-2017

Q(β^-)=−12130 *SY*; S(n)=12660 *SY*; S(p)=2940 *SY*; Q(α)=3150 *SY* 2017Wa10
ΔQ(β^-)=360, ΔS(n)=360, ΔS(p)=200, ΔQ(α)=280 (syst,2017Wa10).
S(2n)=22850 *360*, S(2p)=3570 *200*, Q(εp)=4940 *200*, Q(β^+)=5950 *200* (syst,2017Wa10).
First identification of ^{138}Gd nuclide by 1985Li13 via ^{92}Mo(^{50}Cr,2p2nγ).
Nuclear structure calculations: 2014Gi01, 2011Bh06, 2010Bh05, 1999Xu01, 1996La03.

^{138}Gd Levels

Cross Reference (XREF) Flags

A ^{92}Mo(^{50}Cr,2p2nγ)
B ^{106}Cd(^{35}Cl,p2nγ)
C ^{106}Cd(^{36}Ar,2p2nγ)

E(level)†	Jπ‡	$T_{1/2}$#	XREF	Comments
0@	0^+	4.7 s *9*	ABC	%ε+%β^+=100 $T_{1/2}$: from γ(t) gated by Eu-K$_\alpha$ X rays in ε decay of ^{138}Gd (1999Xi04).
220.86@ *18*	2^+	215 ps *12*	ABC	Jπ: E2 220.86γ to 0^+, member of rotational band. $T_{1/2}$: weighted average of 213 ps *12* in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr10) and 221 ps *21* in ^{92}Mo(^{50}Cr,2p2nγ) (1988Bi03).
605.1@ *3*	4^+	9.2 ps *12*	ABC	Jπ: 384.28γ E2 to 2^+, member of rotational band. $T_{1/2}$: from 2011Pr10 in ^{106}Cd(^{36}Ar,2p2nγ). Other: 2.5 ps *14* from 1988Bi03 in ^{92}Mo(^{50}Cr,2p2nγ).
1080.4& *3*	(4^+)		B	Jπ: proposed by 1994Pa14 in ^{106}Cd(^{35}Cl,p2nγ) based on systematics of neighbouring even-even nuclei.
1094.0@ *3*	6^+	3.4 ps *11*	ABC	Jπ: 488.90γ E2 to 4^+, member of rotational band. $T_{1/2}$: weighted average of 2.6 ps *10* from 2011Pr10 in ^{106}Cd(^{36}Ar,2p2nγ) and 4.9 ps *14* from 1988Bi03 in ^{92}Mo(^{50}Cr,2p2nγ).
1608.0& *3*	(6^+)		B	Jπ: 527.6γ to (4^+), band assignment.
1649.4@ *4*	8^+	1.3 ps *3*	ABC	Jπ: 555.41γ E2 to 6^+, member of rotational band. $T_{1/2}$: from 2011Pr10 in ^{106}Cd(^{36}Ar,2p2nγ).
2202.5& *4*	(8^+)		B	Jπ: 594.4γ E2 to (6^+).
2232.6b *11*	(8^-)	6.2 μs *2*	BC	Jπ: systematics of similar isomers in neighboring N=74 nuclides; 583.2γ to 8^+; $T_{1/2}$: from (recoil)γ(t) in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02). Other: 6 us *1* from γ(t) in ^{106}Cd(^{35}Cl,p2nγ) (1997Br02). Isomeric ratio=5 *1* (2012My01).
2266.0@ *4*	10^+		AB	Jπ: 616.3γ E2 to 8^+, member of rotational band.
2300.1a *4*	(7^-)		B	Jπ: 1206.5γ to 6^+, band head of π=− band.
2628.1b *11*	(9^-)		C	Jπ: 395.7γ ΔJ=1 to (8^-), band assignment.
2633.1& *4*	(10^+)		B	Jπ: 430.6γ E2 to (8^+).
2728.3 *4*	(8^-)		B	Jπ: proposed by 1994Pa14 in ^{106}Cd(^{35}Cl,p2nγ). 1994Pa14 states that the 1079-keV transition feeding the yrast 8^+ state may connect to the unfavored signature of the $\pi h_{11/2}\otimes g_{7/2}$ configuration.
2755.9a *4*	(9^-)		B	Jπ: 456.1γ to (7^-), 1106.5γ to 8^+, band assignment.
2951.9@ *4*	12^+		AB	Jπ: 686.0γ E2 to 10^+, member of rotational band.
3043.8b *11*	(10^-)		C	
3175.6& *5*	(12^+)		B	Jπ: 542.5γ E2 to (10^+).

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Adopted Levels, Gammas (continued)

^{138}Gd Levels (continued)

E(level)[†]	Jπ[‡]	XREF	Comments
3294.6[a] 4	(11⁻)	B	Jπ: 539.1γ E2 to (9⁻).
3471.5[b] 11	(11⁻)	C	Jπ: 842.9γ E2 to (9⁻).
3713.6[@] 5	14⁺	AB	Jπ: 761.7γ E2 to 12⁺, member of rotational band.
3785.6[&] 5	(14⁺)	B	Jπ: 610.0γ E2 to (12⁺).
3904.2[b] 11	(12⁻)	C	Jπ: 860.8γ E2 to (10⁻).
3907.8[a] 4	(13⁻)	B	Jπ: 613.0γ E2 to (11⁻).
4305.9[b] 11	(13⁻)	C	Jπ: 834.0γ E2 to (11⁻).
4362.3[c] 12	(13⁻)	C	Jπ: 458.6γ to (12⁻), 891.4γ to (11⁻), band assignment.
4467.7[&] 5	(16⁺)	B	Jπ: 682.1γ E2 to (14⁺).
4551.4[@] 5	16⁺	B	Jπ: 837.8γ E2 to 14⁺, member of rotational band.
4567.0[c] 12	(14⁻)	C	Jπ: 663.0γ E2 to (12⁻).
4591.3[a] 5	(15⁻)	B	Jπ: 683.5γ E2 to (13⁻).
4684.7[d] 12	(14⁻)	C	Jπ: K^{π}=14-, 4-qp band head, 378.9γ M1+E2 to (13⁻), Configuration=ν(9/2[514],7/2[404])⊗π(5/2[532],7/2[523]) (2011Pr02).
4776.4[c] 12	(15⁻)	C	Jπ: 209.4γ M1+E2 to (14⁻), band assignment.
4857.2[d] 12	(15⁻)	C	Jπ: 172.5γ M1+E2 to (14⁻), band assignment.
5029.4[c] 12	(16⁻)	C	Jπ: 253.0γ M1+E2 to (15⁻), band assignment.
5087.2[d] 12	(16⁻)	C	Jπ: 230.0γ M1+E2 to (15⁻), band assignment.
5269.2[&] 6	(18⁺)	B	Jπ: 801.5γ to (16⁺), band assignment.
5329.0[c] 12	(17⁻)	C	Jπ: 299.8γ M1+E2 to (16⁻), band assignment.
5342.4[a] 5	(17⁻)	B	Jπ: 751.1γ to (15⁻), band assignment.
5372.1[d] 13	(17⁻)	C	Jπ: 285.0γ M1+E2 to (16⁻), band assignment.
5459.9[@] 6	18⁺	B	Jπ: 908.5γ E2 to 16⁺, member of rotational band.
5681.8[c] 12	(18⁻)	C	Jπ: 352.9γ M1+E2 to (17⁻), band assignment.
5714.5[d] 13	(18⁻)	C	Jπ: 342.5γ M1+E2 to (17⁻), band assignment.
6071.7[c] 14	(19⁻)	C	Jπ: 389.9γ to (18⁻), band assignment.
6134.9[d] 14	(19⁻)	C	Jπ: 420.4γ to (18⁻), 762.6γ to (17⁻), band assignment.
6164.8[a] 6	(19⁻)	B	Jπ: 822.4γ to (17⁻), band assignment.
6168.3[&] 6	(20⁺)	B	Jπ: 899.1γ to (18⁺), band assignment.
6429.3[@] 6	(20⁺)	B	Jπ: 969.4γ to 18⁺, band assignment.
6501.0[d] 16	(20⁻)	C	Jπ: 366.1γ to (19⁻), band assignment.
7146.4[&] 7	(22⁺)	B	Jπ: 978.1γ to (20⁺), band assignment.
7442.7[@] 6	(22⁺)	B	Jπ: 1013.4γ to (20⁺), band assignment.

[†] From a least-squares fit to γ-ray energies.
[‡] From band′s energy and intensity patterns, deduced γ-ray multipolarity.
[#] From 2011Pr10 in ^{106}Cd(^{36}Ar,2p2nγ) using Recoil-Distance Doppler-Shift technique and/or 1988Bi03 in ^{92}Mo(^{50}Cr,2p2nγ) using recoil distance method (RDM) with feeding corrections assuming preceding state in band has the same deformation. Weighted average is taken when available.
[@] Band(A): g.s. band.
[&] Band(B): π=+ band configuration=$\pi h^2_{11/2}$. The lower 4⁺, 6⁺, 8⁺ members are probably members of the γ-vibrational band in ^{138}Gd (1994Pa14).
[a] Band(C): π=− band. configuration=$\pi h_{11/2}\otimes\pi g_{7/2}$ (1994Pa14).
[b] Band(D): π=− band built on (8⁻) 6 μs isomer. Configuration=ν9/2[514]⊗ν7/2[404] (2011Pr02).
[c] Band(E): K^{π}=(12⁻), 4-qp band. Configuration=ν(9/2[514],7/2[404])⊗π(3/2[411],5/2[413]) (2011Pr02).
[d] Band(F): K^{π}=(14⁻), 4-qp band Configuration=ν(9/2[514],7/2[404])⊗π(5/2[532],7/2[523]) (2011Pr02).

Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
220.86	2^+	220.86 *18*	100	0	0^+	E2	0.1599	α(K)=0.1146 *17*; α(L)=0.0352 *5*; α(M)=0.00807 *12* α(N)=0.00182 *3*; α(O)=0.000252 *4*; α(P)=6.73×10^{-6} *10* B(E2)(W.u.)=102 *+7−6* E_γ: weighted average of 220.90 *18* from ^{92}Mo(^{50}Cr,2p2nγ) and 220.8 *2* from ^{106}Cd(^{35}Cl,p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ); M2 is ruled out bu RUL.
605.1	4^+	384.28 *19*	100	220.86	2^+	E2	0.0288	α(K)=0.0228 *4*; α(L)=0.00467 *7*; α(M)=0.001047 *15* α(N)=0.000238 *4*; α(O)=3.45×10^{-5} *5*; α(P)=1.485×10^{-6} *21* B(E2)(W.u.)=168 *+26−20* E_γ: weighted average of 384.17 *19* from ^{92}Mo(^{50}Cr,2p2nγ) and 384.4 *2* from ^{106}Cd(^{35}Cl,p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ); M2 is ruled out bu RUL.
1080.4	(4^+)	475.2[‡] *2*	100	605.1	4^+			
1094.0	6^+	488.90 *17*	100	605.1	4^+	E2	0.01480	α(K)=0.01202 *17*; α(L)=0.00218 *3*; α(M)=0.000483 *7* α(N)=0.0001101 *16*; α(O)=1.625×10^{-5} *23*; α(P)=8.04×10^{-7} *12* B(E2)(W.u.)=1.4×10^2 *+7−4* E_γ: weighted average of 488.75 *17* from ^{92}Mo(^{50}Cr,2p2nγ) and 489.1 *2* from ^{106}Cd(^{35}Cl,p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ); M2 is ruled out bu RUL.
1608.0	(6^+)	514.0[‡] *2*	100[‡]	1094.0	6^+			
		527.6[‡] *2*	54[‡]	1080.4	(4^+)			
		1002.7[‡] *2*	<19[‡]	605.1	4^+			
1649.4	8^+	555.41 *13*	100	1094.0	6^+	E2	0.01063	α(K)=0.00872 *13*; α(L)=0.001496 *21*; α(M)=0.000331 *5* α(N)=7.54×10^{-5} *11*; α(O)=1.123×10^{-5} *16*; α(P)=5.90×10^{-7} *9* B(E2)(W.u.)=1.9×10^2 *+6−4* E_γ: weighted average of 555.33 *13* from ^{92}Mo(^{50}Cr,2p2nγ) and 555.6 *2* from ^{106}Cd(^{35}Cl,p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ); M2 is ruled out bu RUL.
2202.5	(8^+)	553.5[‡] *2*	44[‡]	1649.4	8^+			
		594.4[‡] *2*	75[‡]	1608.0	(6^+)	E2	0.00897	α(K)=0.00739 *11*; α(L)=0.001235 *18*; α(M)=0.000272 *4* α(N)=6.22×10^{-5} *9*; α(O)=9.30×10^{-6} *13*; α(P)=5.02×10^{-7} *7* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
		1108.3[‡] *2*	100[‡]	1094.0	6^+	[E2]	0.00223	α(K)=0.00188 *3*; α(L)=0.000268 *4*; α(M)=5.81×10^{-5} *9* α(N)=1.332×10^{-5} *19*; α(O)=2.05×10^{-6} *3*; α(P)=1.307×10^{-7} *19*; α(IPF)=4.07×10^{-7} *7*

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Adopted Levels, Gammas (continued)

γ(^{138}Gd) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
2232.6	(8$^-$)	583.2	100	1649.4	8$^+$	[E1]	0.00336	α(K)=0.00287 *4*; α(L)=0.000384 *6*; α(M)=8.27×10^{-5} *12* α(N)=1.89×10^{-5} *3*; α(O)=2.92×10^{-6} *4*; α(P)=1.90×10^{-7} *3* B(E1)(W.u.)=2.05×10^{-10} *7* E_γ: from 1997Br02 in ^{106}Cd(^{35}Cl,p2nγ). This transition is from the K^π=(8$^-$) isomer to the 8$^+$ level of the g.s. band that is assumed to have K=0 and it is therefore hindered by K-forbiddenness, leading to a decrease in the transition strength of the E1 decay (1997Br02).
2266.0	10$^+$	616.3 *2*	100	1649.4	8$^+$	E2	0.00821	α(K)=0.00678 *10*; α(L)=0.001118 *16*; α(M)=0.000246 *4* α(N)=5.62×10^{-5} *8*; α(O)=8.42×10^{-6} *12*; α(P)=4.62×10^{-7} *7* E_γ: weighted average of 616.0 *3* from ^{92}Mo(^{50}Cr,2p2nγ) and 616.4 *2* from ^{106}Cd(^{35}Cl,p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
2300.1	(7$^-$)	1206.5[‡] *2*	100	1094.0	6$^+$			
2628.1	(9$^-$)	395.7 *2*	100	2232.6	(8$^-$)	M1+E2	0.036 *10*	α(K)=0.030 *9*; α(L)=0.0049 *7*; α(M)=0.00107 *12* α(N)=0.00024 *3*; α(O)=3.7×10^{-5} *6*; α(P)=2.1×10^{-6} *8* Mult.: from γ(θ) data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
2633.1	(10$^+$)	430.6[‡] *2*	100	2202.5	(8$^+$)	E2	0.0209	α(K)=0.01676 *24*; α(L)=0.00323 *5*; α(M)=0.000720 *11* α(N)=0.0001637 *23*; α(O)=2.39×10^{-5} *4*; α(P)=1.106×10^{-6} *16* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
2728.3	(8$^-$)	1078.9[‡] *2*	100	1649.4	8$^+$			
2755.9	(9$^-$)	456.1[‡] *2*	19[‡]	2300.1	(7$^-$)			
		1106.5[‡] *2*	100[‡]	1649.4	8$^+$	[E1]	9.45×10^{-4}	α(K)=0.000809 *12*; α(L)=0.0001051 *15*; α(M)=2.26×10^{-5} *4* α(N)=5.18×10^{-6} *8*; α(O)=8.04×10^{-7} *12*; α(P)=5.44×10^{-8} *8*; α(IPF)=2.34×10^{-6} *4*
2951.9	12$^+$	686.0 *2*	100	2266.0	10$^+$	E2	0.00635	α(K)=0.00527 *8*; α(L)=0.000839 *12*; α(M)=0.000184 *3* α(N)=4.21×10^{-5} *6*; α(O)=6.35×10^{-6} *9*; α(P)=3.61×10^{-7} *5* E_γ: from ^{106}Cd(^{35}Cl,p2nγ). Other: 681.2 *3* from ^{92}Mo(^{50}Cr,2p2nγ), making the J^π=12$^+$ state at E=2946 keV. Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
3043.8	(10$^-$)	416.2 *3*	100 *9*	2628.1	(9$^-$)	M1+E2	0.032 *9*	α(K)=0.026 *8*; α(L)=0.0042 *6*;

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
								α(M)=0.00092 *12* α(N)=0.00021 *3*; α(O)=3.2×10^{-5} *6*; α(P)=1.9×10^{-6} *7* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
3043.8	(10$^-$)	810.9 *3*	67 *8*	2232.6	(8$^-$)	E2	0.00433	α(K)=0.00362 *5*; α(L)=0.000550 *8*; α(M)=0.0001201 *17* α(N)=2.75×10^{-5} *4*; α(O)=4.18×10^{-6} *6*; α(P)=2.50×10^{-7} *4* Mult.: Q from $\gamma(\theta)$ in ^{106}Cd(^{36}Ar,2p2nγ), E2 assumed based on band structure.
3175.6	(12$^+$)	542.5[‡] *2*	100	2633.1	(10$^+$)	E2	0.01129	α(K)=0.00924 *13*; α(L)=0.001601 *23*; α(M)=0.000354 *5* α(N)=8.07×10^{-5} *12*; α(O)=1.200×10^{-5} *17*; α(P)=6.24×10^{-7} *9* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
3294.6	(11$^-$)	539.1[‡] *2*	100[‡]	2755.9	(9$^-$)	E2	0.01147	α(K)=0.00939 *14*; α(L)=0.001630 *23*; α(M)=0.000361 *5* α(N)=8.22×10^{-5} *12*; α(O)=1.222×10^{-5} *18*; α(P)=6.34×10^{-7} *9* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
3471.5	(11$^-$)	1028.2[‡] *2* 427.7 *1*	98[‡] 92 *11*	2266.0 3043.8	10$^+$ (10$^-$)	M1+E2	0.030 *9*	α(K)=0.025 *8*; α(L)=0.0039 *6*; α(M)=0.00085 *12* α(N)=0.00020 *3*; α(O)=3.0×10^{-5} *6*; α(P)=1.7×10^{-6} *7* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		842.9 *4*	100 *6*	2628.1	(9$^-$)	E2	0.00397	α(K)=0.00333 *5*; α(L)=0.000501 *7*; α(M)=0.0001093 *16* α(N)=2.50×10^{-5} *4*; α(O)=3.81×10^{-6} *6*; α(P)=2.30×10^{-7} *4* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
3713.6	14$^+$	761.7 *2*	100	2951.9	12$^+$	E2	0.00498	α(K)=0.00416 *6*; α(L)=0.000642 *9*; α(M)=0.0001405 *20* α(N)=3.21×10^{-5} *5*; α(O)=4.87×10^{-6} *7*; α(P)=2.86×10^{-7} *4* E_γ: from ^{106}Cd(^{35}Cl,p2nγ). Other: 732 from ^{92}Mo(^{50}Cr,2p2nγ). Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
3785.6	(14$^+$)	610.0[‡] *2*	100	3175.6	(12$^+$)	E2	0.00841	α(K)=0.00694 *10*; α(L)=0.001150 *17*; α(M)=0.000253 *4* α(N)=5.78×10^{-5} *9*; α(O)=8.66×10^{-6} *13*; α(P)=4.73×10^{-7} *7* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
3904.2	(12$^-$)	433.0 *2*	80 *15*	3471.5	(11$^-$)	M1+E2	0.029 *8*	α(K)=0.024 *8*; α(L)=0.0038 *6*; α(M)=0.00082 *12* α(N)=0.00019 *3*; α(O)=2.9×10^{-5} *5*; α(P)=1.7×10^{-6} *6*

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
3904.2	(12$^-$)	860.8 *4*	100 *7*	3043.8	(10$^-$)	E2	0.00379	Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02). α(K)=0.00318 *5*; α(L)=0.000476 *7*; α(M)=0.0001039 *15* α(N)=2.38×10^{-5} *4*; α(O)=3.62×10^{-6} *5*; α(P)=2.20×10^{-7} *3*
3907.8	(13$^-$)	613.0[‡] *2*	100[‡]	3294.6	(11$^-$)	E2	0.00831	Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02). α(K)=0.00686 *10*; α(L)=0.001135 *16*; α(M)=0.000250 *4* α(N)=5.71×10^{-5} *8*; α(O)=8.55×10^{-6} *12*; α(P)=4.67×10^{-7} *7* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
		956.0[‡] *2*	<7[‡]	2951.9	12$^+$			
4305.9	(13$^-$)	402.1 *2*	100 *12*	3904.2	(12$^-$)	M1+E2	0.035 *10*	α(K)=0.029 *9*; α(L)=0.0046 *7*; α(M)=0.00102 *12* α(N)=0.00023 *3*; α(O)=3.5×10^{-5} *6*; α(P)=2.0×10^{-6} *8* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		834.0 *2*	94 *15*	3471.5	(11$^-$)	E2	0.00407	α(K)=0.00341 *5*; α(L)=0.000514 *8*; α(M)=0.0001121 *16* α(N)=2.57×10^{-5} *4*; α(O)=3.91×10^{-6} *6*; α(P)=2.35×10^{-7} *4* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
4362.3	(13$^-$)	458.6[@] *7*	<100	3904.2	(12$^-$)	[M1]	0.0315	α(K)=0.0268 *4*; α(L)=0.00373 *6*; α(M)=0.000808 *12* α(N)=0.000186 *3*; α(O)=2.89×10^{-5} *5*; α(P)=1.96×10^{-6} *3*
		891.4[@] *7*	<75	3471.5	(11$^-$)	[E2]	0.00352	α(K)=0.00296 *5*; α(L)=0.000438 *7*; α(M)=9.55×10^{-5} *14* α(N)=2.19×10^{-5} *3*; α(O)=3.34×10^{-6} *5*; α(P)=2.04×10^{-7} *3*
4467.7	(16$^+$)	682.1[‡] *2*	100	3785.6	(14$^+$)	E2	0.00643	α(K)=0.00534 *8*; α(L)=0.000852 *12*; α(M)=0.000187 *3* α(N)=4.28×10^{-5} *6*; α(O)=6.44×10^{-6} *9*; α(P)=3.66×10^{-7} *6* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
4551.4	16$^+$	837.8[‡] *2*	100	3713.6	14$^+$	E2	0.00402	α(K)=0.00338 *5*; α(L)=0.000508 *8*; α(M)=0.0001109 *16* α(N)=2.54×10^{-5} *4*; α(O)=3.86×10^{-6} *6*; α(P)=2.33×10^{-7} *4* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
4567.0	(14$^-$)	204.6 *3*	<16	4362.3	(13$^-$)	[M1]	0.269	α(K)=0.228 *4*; α(L)=0.0325 *5*; α(M)=0.00705 *11* α(N)=0.001623 *24*; α(O)=0.000252 *4*; α(P)=1.690×10^{-5} *25*
		261.1 *3*	100 *3*	4305.9	(13$^-$)	M1+E2	0.116 *23*	α(K)=0.093 *24*; α(L)=0.0175 *10*; α(M)=0.0039 *3* α(N)=0.00089 *6*; α(O)=0.000131 *3*; α(P)=6.5×10^{-6} *23*

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
4567.0	(14$^-$)	663.0 *11*	66 *9*	3904.2	(12$^-$)	E2	0.00688	Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02). α(K)=0.00571 *9*; α(L)=0.000918 *14*; α(M)=0.000202 *3* α(N)=4.61×10^{-5} *7*; α(O)=6.94×10^{-6} *11*; α(P)=3.90×10^{-7} *6*
4591.3	(15$^-$)	683.5[‡] *2*	100	3907.8	(13$^-$)	E2	0.00640	Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02). α(K)=0.00532 *8*; α(L)=0.000847 *12*; α(M)=0.000186 *3* α(N)=4.25×10^{-5} *6*; α(O)=6.41×10^{-6} *9*; α(P)=3.64×10^{-7} *6*
4684.7	(14$^-$)	378.9 *3*	100 *18*	4305.9	(13$^-$)	M1+E2	0.041 *11*	Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band. α(K)=0.034 *10*; α(L)=0.0055 *7*; α(M)=0.00121 *12* α(N)=0.00028 *3*; α(O)=4.2×10^{-5} *6*; α(P)=2.4×10^{-6} *9*
		780.0 *10*	41 *18*	3904.2	(12$^-$)	[E2]	0.00472	α(K)=0.00395 *6*; α(L)=0.000605 *9*; α(M)=0.0001323 *19* α(N)=3.03×10^{-5} *5*; α(O)=4.59×10^{-6} *7*; α(P)=2.72×10^{-7} *4*
4776.4	(15$^-$)	209.4 *3*	100 *9*	4567.0	(14$^-$)	M1+E2	0.22 *4*	α(K)=0.17 *4*; α(L)=0.037 *7*; α(M)=0.0083 *17* α(N)=0.0019 *4*; α(O)=0.00027 *4*; α(P)=1.2×10^{-5} *4* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		414.9 *9*	9 *6*	4362.3	(13$^-$)	[E2]	0.0232	α(K)=0.0185 *3*; α(L)=0.00363 *6*; α(M)=0.000812 *13* α(N)=0.000185 *3*; α(O)=2.69×10^{-5} *5*; α(P)=1.217×10^{-6} *19*
4857.2	(15$^-$)	172.5 *2*	100	4684.7	(14$^-$)	M1+E2	0.40 *4*	α(K)=0.30 *7*; α(L)=0.074 *22*; α(M)=0.017 *6* α(N)=0.0038 *12*; α(O)=0.00054 *14*; α(P)=2.0×10^{-5} *7* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
5029.4	(16$^-$)	253.0 *4*	100 *9*	4776.4	(15$^-$)	M1+E2	0.127 *24*	α(K)=0.10 *3*; α(L)=0.0195 *14*; α(M)=0.0043 *4* α(N)=0.00099 *9*; α(O)=0.000145 *5*; α(P)=7.0×10^{-6} *25* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		462.4 *2*	27 *18*	4567.0	(14$^-$)	[E2]	0.01719	α(K)=0.01388 *20*; α(L)=0.00258 *4*; α(M)=0.000574 *8* α(N)=0.0001307 *19*; α(O)=1.92×10^{-5} *3*; α(P)=9.24×10^{-7} *13*
5087.2	(16$^-$)	230.0 *4*	100	4857.2	(15$^-$)	M1+E2	0.17 *3*	α(K)=0.13 *4*; α(L)=0.027 *4*; α(M)=0.0060 *9* α(N)=0.00136 *19*; α(O)=0.000199 *17*; α(P)=9.E−6 *4* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
5269.2	(18$^+$)	801.5[‡] *2*	100	4467.7	(16$^+$)			
5329.0	(17$^-$)	299.8 *4*	100 *22*	5029.4	(16$^-$)	M1+E2	0.078 *18*	α(K)=0.064 *18*; α(L)=0.0113 *3*; α(M)=0.00250 *4* α(N)=0.000569 *9*; α(O)=8.5×10^{-5} *5*; α(P)=4.4×10^{-6} *16*

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
								Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
5329.0	(17$^-$)	552.8 *13*	79 *22*	4776.4	(15$^-$)	[E2]	0.01076 *17*	α(K)=0.00882 *14*; α(L)=0.001516 *24*; α(M)=0.000335 *6* α(N)=7.64×10^{-5} *12*; α(O)=1.138×10^{-5} *18*; α(P)=5.97×10^{-7} *9*
5342.4	(17$^-$)	751.1[‡] *2*	100	4591.3	(15$^-$)			
5372.1	(17$^-$)	285.0 *2*	100 *9*	5087.2	(16$^-$)	M1+E2	0.090 *20*	α(K)=0.073 *20*; α(L)=0.01322 *21*; α(M)=0.00293 *10* α(N)=0.000669 *17*; α(O)=9.9×10^{-5} *3*; α(P)=5.1×10^{-6} *18* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		514.6 *12*	33 *9*	4857.2	(15$^-$)			
5459.9	18$^+$	908.5[‡] *2*	100	4551.4	16$^+$	E2	0.00337	α(K)=0.00284 *4*; α(L)=0.000419 *6*; α(M)=9.13×10^{-5} *13* α(N)=2.09×10^{-5} *3*; α(O)=3.19×10^{-6} *5*; α(P)=1.96×10^{-7} *3* Mult.: Q from γ(DCO) in ^{106}Cd(^{35}Cl,p2nγ), member of rotational band.
5681.8	(18$^-$)	352.9 *2*	83 *25*	5329.0	(17$^-$)	M1+E2	0.050 *13*	α(K)=0.041 *12*; α(L)=0.0068 *6*; α(M)=0.00150 *11* α(N)=0.00034 *3*; α(O)=5.2×10^{-5} *6*; α(P)=2.9×10^{-6} *11* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		651.2 *9*	100 *17*	5029.4	(16$^-$)	[E2]	0.00718	α(K)=0.00595 *9*; α(L)=0.000963 *14*; α(M)=0.000212 *3* α(N)=4.84×10^{-5} *7*; α(O)=7.27×10^{-6} *11*; α(P)=4.07×10^{-7} *6*
5714.5	(18$^-$)	342.5 *3*	100 *10*	5372.1	(17$^-$)	M1+E2	0.054 *14*	α(K)=0.044 *13*; α(L)=0.0075 *6*; α(M)=0.00165 *10* α(N)=0.000376 *25*; α(O)=5.6×10^{-5} *6*; α(P)=3.1×10^{-6} *11* Mult.: from $\gamma(\theta)$ data and band structure in ^{106}Cd(^{36}Ar,2p2nγ) (2011Pr02).
		626.8 *8*	90 *10*	5087.2	(16$^-$)	[E2]	0.00787	α(K)=0.00651 *10*; α(L)=0.001068 *16*; α(M)=0.000235 *4* α(N)=5.37×10^{-5} *8*; α(O)=8.05×10^{-6} *12*; α(P)=4.44×10^{-7} *7*
6071.7	(19$^-$)	389.9 *7*	100	5681.8	(18$^-$)	[M1]	0.0480	α(K)=0.0407 *6*; α(L)=0.00570 *9*; α(M)=0.001235 *19* α(N)=0.000284 *5*; α(O)=4.42×10^{-5} *7*; α(P)=2.99×10^{-6} *5*
6134.9	(19$^-$)	420.4 *6*	77 *15*	5714.5	(18$^-$)	[M1]	0.0395	α(K)=0.0335 *5*; α(L)=0.00468 *7*; α(M)=0.001013 *15* α(N)=0.000233 *4*; α(O)=3.63×10^{-5} *6*; α(P)=2.46×10^{-6} *4*
		762.6 *8*	100 *39*	5372.1	(17$^-$)	[E2]	0.00497	α(K)=0.00415 *6*; α(L)=0.000640 *10*; α(M)=0.0001401 *20* α(N)=3.21×10^{-5} *5*; α(O)=4.86×10^{-6} *7*; α(P)=2.86×10^{-7} *4*
6164.8	(19$^-$)	822.4[‡] *2*	100	5342.4	(17$^-$)			

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Adopted Levels, Gammas (continued)

$\gamma(^{138}Gd)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.	α[#]	Comments
6168.3	(20^+)	899.1[‡] *2*	100	5269.2	(18^+)			
6429.3	(20^+)	969.4[‡] *2*	100	5459.9	18^+			
6501.0	(20^-)	366.1 *8*	100	6134.9	(19^-)	[M1]	0.0565 *9*	α(K)=0.0479 *8*; α(L)=0.00673 *11*; α(M)=0.001458 *22* α(N)=0.000336 *5*; α(O)=5.22×10^{-5} *8*; α(P)=3.53×10^{-6} *6*
7146.4	(22^+)	978.1[‡] *2*	100	6168.3	(20^+)			
7442.7	(22^+)	1013.4[‡] *2*	100	6429.3	(20^+)			

[†] From $^{106}Cd(^{36}Ar,2p2n\gamma)$, unless otherwise noted.
[‡] From $^{92}Mo(^{50}Cr,2p2n\gamma)$ only.
[#] Additional information 1.
[@] Placement of transition in the level scheme is uncertain.

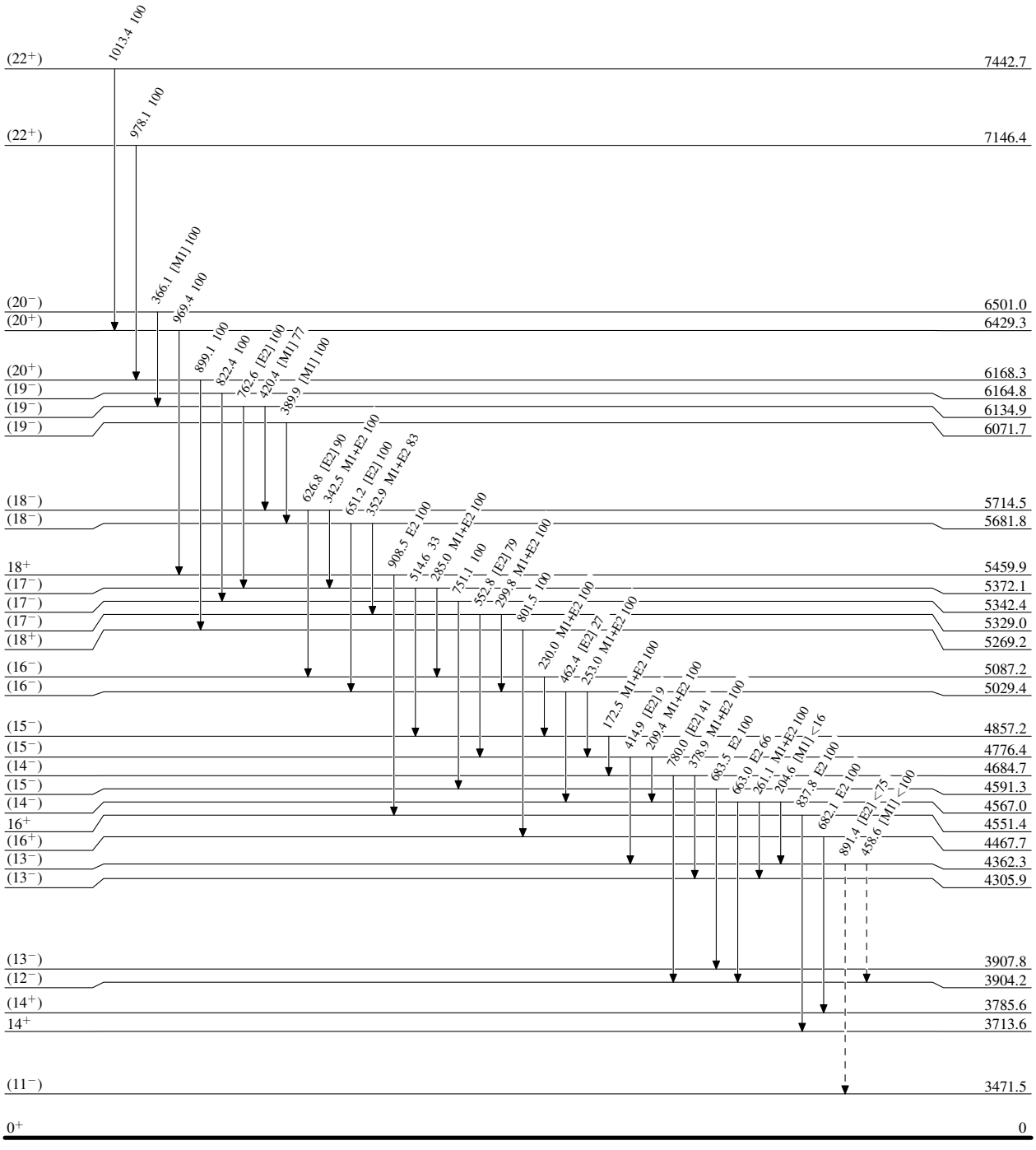
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

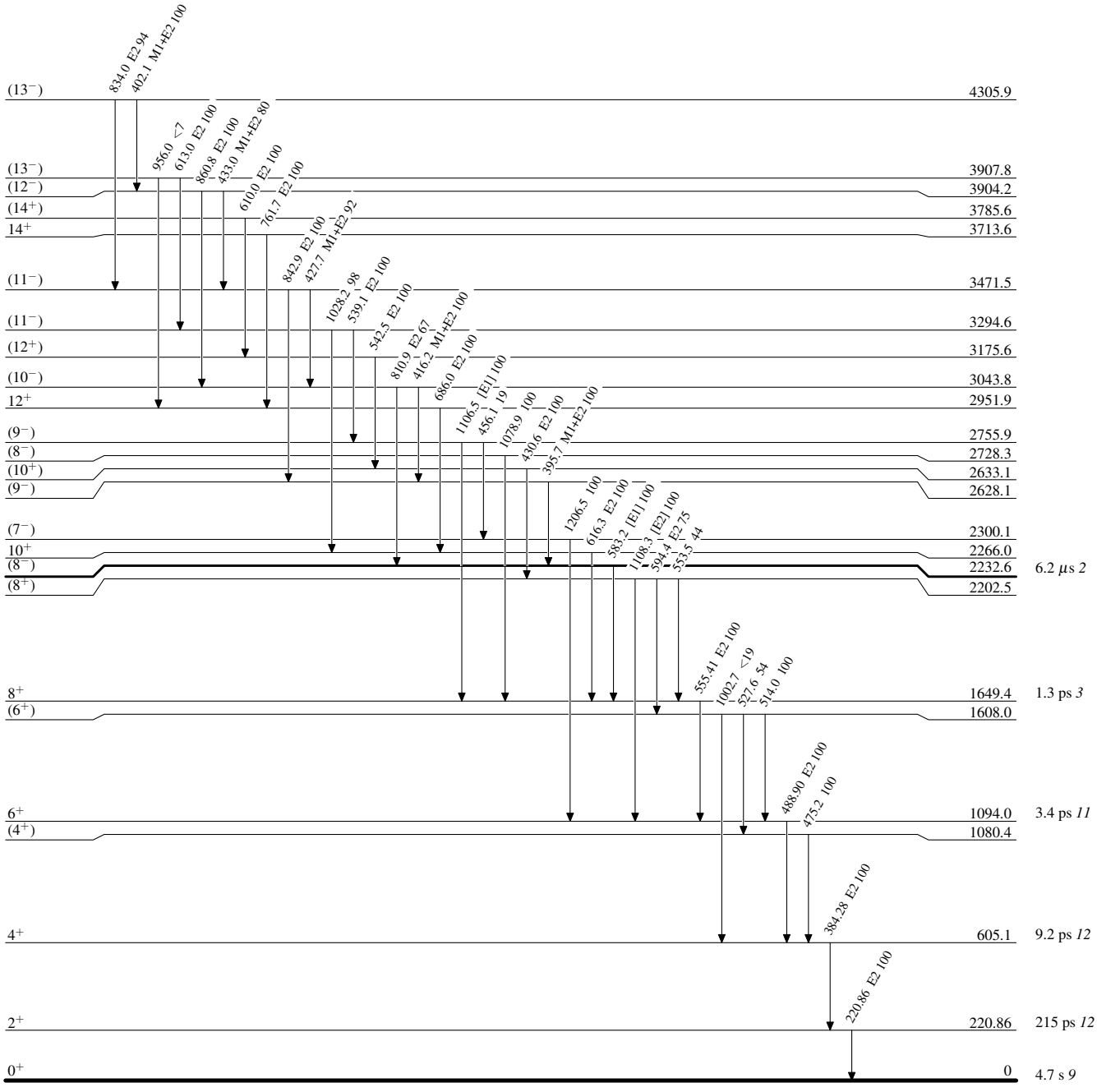


$^{138}_{64}Gd_{74}$

Adopted Levels, Gammas

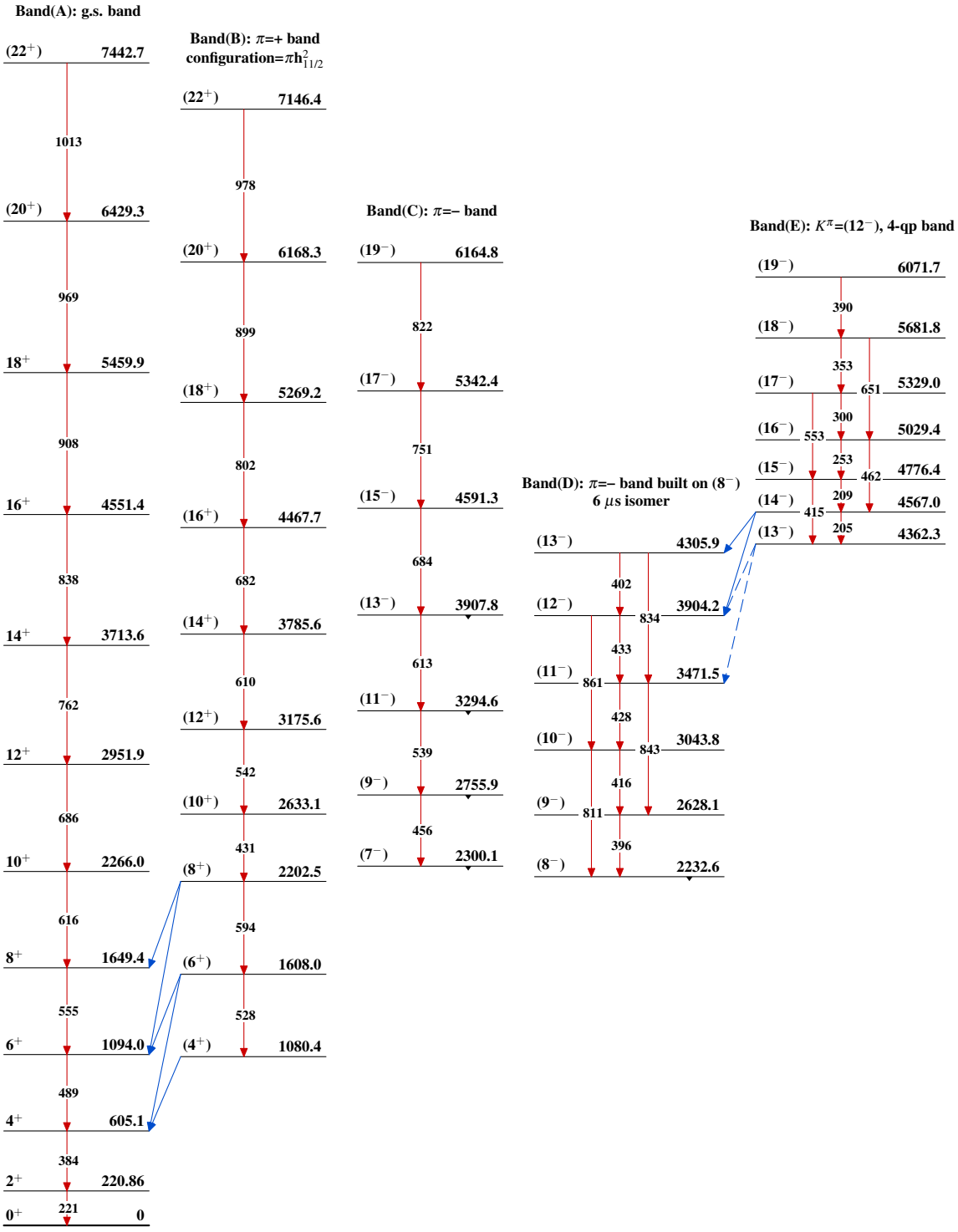
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{138}_{64}Gd_{74}$

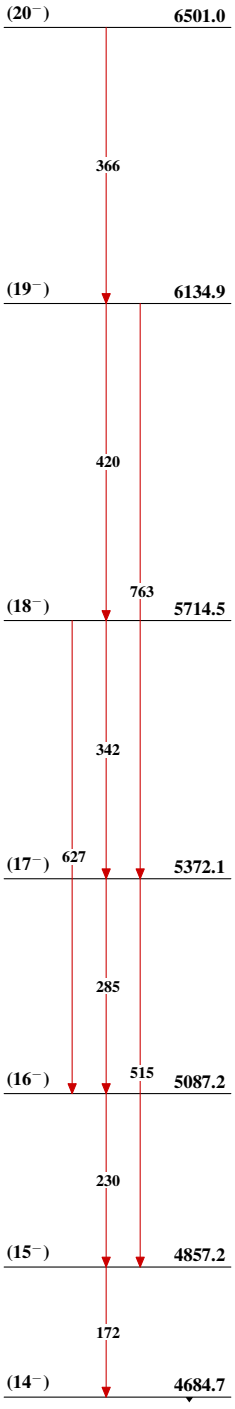
Adopted Levels, Gammas



$^{138}_{64}Gd_{74}$

Adopted Levels, Gammas (continued)

Band(F): K^{π}=(14^{-}), 4-qp band Configuration=ν(9/2[514], 7/2[404])$\otimes\pi$(5/2[532],7/2[523]) (2011Pr02)



$^{138}_{64}Gd_{74}$