Adopted Levels, Gammas

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	25-Jan-2015

Q(β^-)=3350 *SY*; S(n)=6120 *SY*; S(p)=11130 *SY*; Q(α)=−2430 *SY* 2012Wa38
Estimated uncertainties (2012Wa38): 600 for Q(β^-), 670 for S(n), 680 for S(p), 630 for Q(α).
S(2n)=10900 *630*, S(2p)=21010 *670* (syst,2012Wa38).
2005Ic02: production and identification of ^{166}Gd: 15.5 MeV proton-induced fission of ^{238}U; JAERI-ISOL on-line mass separation of products; plastic scin and Ge detectors for x-ray and γ detection.
2014Mu09: theoretical calculation of β-decay half-life, and Gamow-Teller strength functions.

^{166}Gd Levels

Cross Reference (XREF) Flags

A ^{166}Eu β^- decay (1.7 s)
B ^{166}Gd IT decay (950 ns)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
0.0#	0+	4.8 s *10*	AB	%β^-=100 Jπ: g.s. of even-even nucleus. $T_{1/2}$: from γ decay curves (2005Ic02).
70.0# *10*	(2+)		AB	
230.8# *11*	(4+)		AB	
479.6# *11*	(6+)		B	
1240.1@ *11*	(3+)		B	
1318.9@ *11*	(4+)		B	
1350.1& *11*	(4+)		B	
1418.4@ *11*	(5+)		B	
1455.2& *11*	(5+)		B	
1601.5 *11*	(6−)	950 ns *60*	B	%IT=100 Configuration=ν5/2[512]⊗ν7/2[633], β_2=0.291, β_4=0.014, β_6=−0.017. $T_{1/2}$: from decay curves obtained from (ion implantation)(γ)(t) correlations for 146-, 161-, 183-, 249-, 1088-, 1170- and 1188-keV γ rays (2014Pa55).

† From least-squares fit to Eγ data.
‡ As proposed by 2014Pa55 based on systematics of even-even nuclides for low-lying levels and potential-energy surface calculations for higher levels above 1 MeV, supported by multipolarities obtained from intensity balances.
# Band(A): The g.s. band. Calculations suggest β_2=0.296, β_4=0.015, β_6=−0.020 for ground state.
@ Band(B): γ-vibrational band. The 2^+ bandhead is expected at ≈1190 keV.
& Band(C): π3/2[411]⊗π5/2[413],K^π=(4^+). Calculations suggest β_2=0.299, β_4=0.017, β_6=−0.022 for 4^+ bandhead.

Adopted Levels, Gammas (continued)

$\gamma(^{166}Gd)$

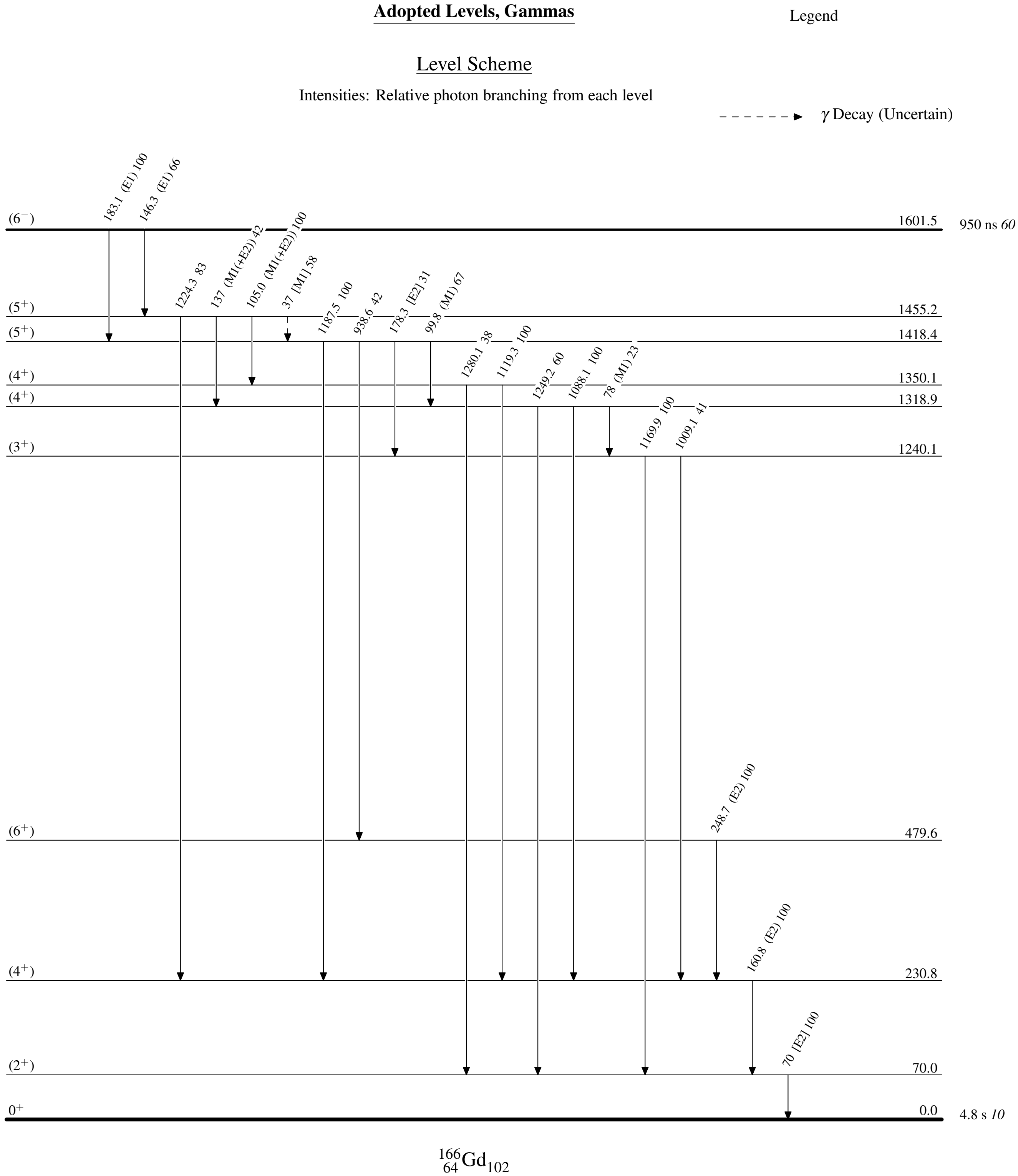
E_i(level)	J_i^π	E_γ†	I_γ†	E_f	J_f^π	Mult.†	α‡	Comments
70.0	(2+)	70 *1*	100	0.0	0+	[E2]	9.7 *6*	α(K)=2.58 *8*; α(L)=5.5 *4*; α(M)=1.30 *10*; α(N)=0.290 *21*; α(O)=0.038 *3*; α(P)=0.000132 *5*
230.8	(4+)	160.8 *2*	100	70.0	(2+)	(E2)	0.465	α(K)=0.299 *5*; α(L)=0.1289 *20*; α(M)=0.0300 *5* α(N)=0.00672 *10*; α(O)=0.000907 *14*; α(P)=1.630×10^{-5} *24*
479.6	(6+)	248.7 *3*	100	230.8	(4+)	(E2)	0.1087	α(K)=0.0802 *12*; α(L)=0.0222 *4*; α(M)=0.00507 *8* α(N)=0.001142 *17*; α(O)=0.0001597 *24*; α(P)=4.83×10^{-6} *7*
1240.1	(3+)	1009.1 *7*	41 *12*	230.8	(4+)			
		1169.9 *3*	100 *21*	70.0	(2+)			
1318.9	(4+)	78 *1*	23 *7*	1240.1	(3+)	(M1)	4.12 *17*	α(K)=3.47 *14*; α(L)=0.50 *2*; α(M)=0.109 *5*; α(N)=0.025 *1*; α(O)=0.0039 *2*; α(P)=0.00026 *1*
		1088.1 *3*	100 *20*	230.8	(4+)			
		1249.2 *3*	60 *17*	70.0	(2+)			
1350.1	(4+)	1119.3 *3*	100 *38*	230.8	(4+)			
		1280.1 *2*	38 *13*	70.0	(2+)			
1418.4	(5+)	99.8 *3*	67 *8*	1318.9	(4+)	(M1)	2.02 *4*	α(K)=1.71; α(L)=0.247 *4*; α(M)=0.0537 *9*; α(N)=0.01235 *21*; α(O)=0.00191 *4*; α(P)=12.8×10^{-5} *2*
		178.3 *2*	31 *6*	1240.1	(3+)	[E2]	0.327	α(K)=0.219 *4*; α(L)=0.0836 *13*; α(M)=0.0194 *3* α(N)=0.00435 *7*; α(O)=0.000591 *9*; α(P)=1.224×10^{-5} *18*
		938.6 *4*	42 *11*	479.6	(6+)			
		1187.5 *3*	100 *19*	230.8	(4+)			
1455.2	(5+)	(37)	58 *33*	1418.4	(5+)	[M1]	5.7 *5*	α(L)=4.49 *7*; α(M)=0.976 *14*; α(N)=0.225 *4*; α(O)=0.0347 *5*; α(P)=0.00230 *4*
		105.0 *3*	100 *17*	1350.1	(4+)	(M1(+E2))	1.93 *18*	α(K)=1.25 *23*; α(L)=0.5 *4*; α(M)=0.12 *8*; α(N)=0.027 *17*; α(O)=0.0037 *21*; α(P)=8.E−5 *3*
		137 *1*	42 *25*	1318.9	(4+)	(M1(+E2))	0.817 *23*	α(K)=0.59 *11*; α(L)=0.18 *8*; α(M)=0.041 *20*; α(N)=0.009 *5*; α(O)=0.0013 *5*; α(P)=3.8×10^{-5} *14*
		1224.3 *3*	83 *33*	230.8	(4+)			
1601.5	(6−)	146.3 *2*	66 *5*	1455.2	(5+)	(E1)	0.1047	B(E1)(W.u.)=2.8×10^{-8} *3* α(K)=0.0884 *13*; α(L)=0.01281 *19*; α(M)=0.00277 *4* α(N)=0.000629 *10*; α(O)=9.36×10^{-5} *14*; α(P)=5.20×10^{-6} *8* Reduced hindrance f_ν=3.77×10^{7} *24* (2014Pa55), assuming the the 146-keV transition feeds the $K^\pi=5^+$ band with ν=1.
		183.1 *2*	100	1418.4	(5+)	(E1)	0.0574	B(E1)(W.u.)=2.15×10^{-8} *16* α(K)=0.0486 *7*; α(L)=0.00692 *10*; α(M)=0.001497 *22* α(N)=0.000341 *5*; α(O)=5.11×10^{-5} *8*; α(P)=2.94×10^{-6} *5* Reduced hindrance f_ν=356 *7* (2014Pa55), assuming the the 183-keV transition feeds the γ band with ν=3.

† From ^{166}Gd IT decay (950 ns). Some E2 admixture is possible for pure M1 multipolarities.
‡ Value overlaps M1 and E2 when δ(E2/M1) is not given for M1(+E2) transitions.

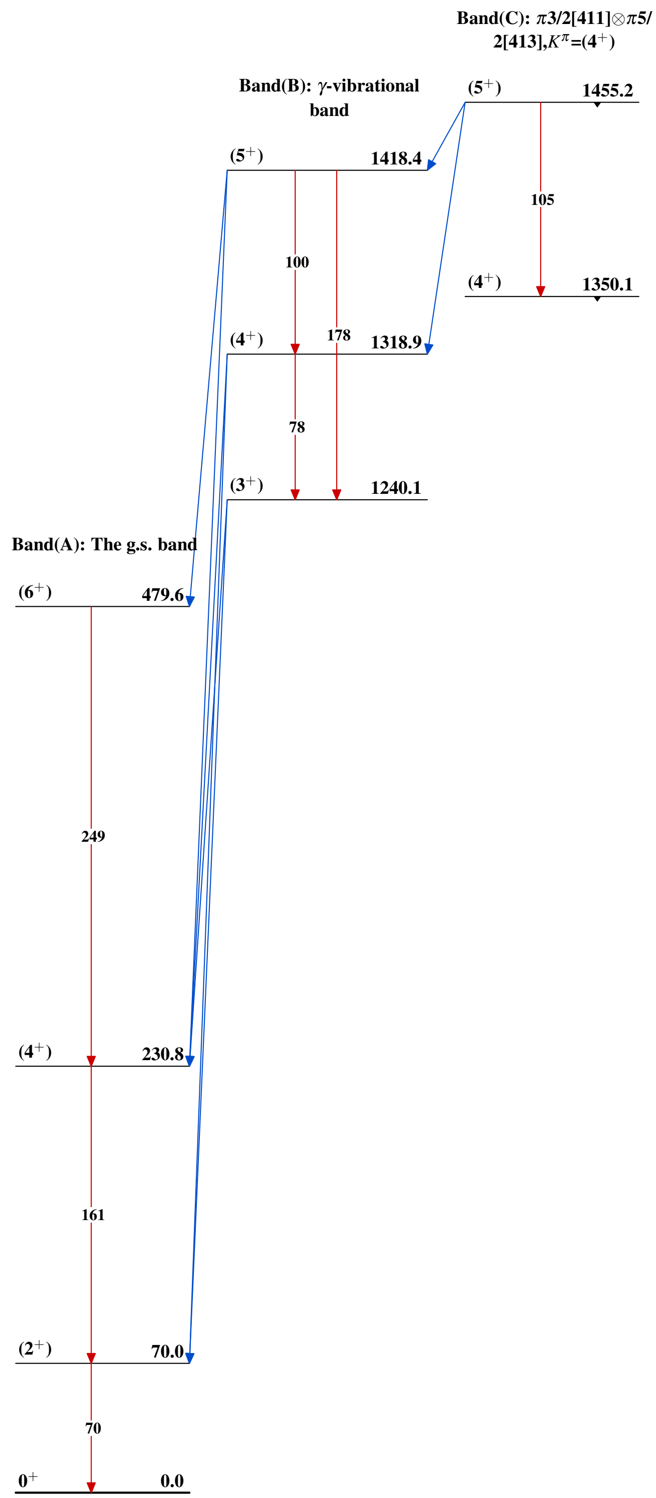
Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



$^{166}_{64}Gd_{102}$