(HI,xnγ) 1990Dr06,1990Pi17

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Incident particles:
^{3}He: E not given (1984Lu09), E=27 MeV (1990Pi17).
α: E=54 MeV (1990Pi17), E=51 MeV (1984Lu09), 48 MeV (1973Kr10), 30 MeV (1979Ha15).
^{11}B: E=49 MeV (2000Po13,2003Po02,2002Bi03).
^{19}F: E=73.5 MeV (1993Pi01).
^{28}Si: E=125 MeV (1990Pi17,2000Po13), E=108-144 MeV (1982Ha22,1979Ha15).
^{36}S: E=170 MeV (1987Pi07,1990Dr06),
Reactions:
^{116}Cd(^{36}S,4nγ): 1990Dr06, 1987Pi07.
^{124}Sn(^{28}Si,4nγ): 1990Pi17, 1982Ha22, 2000Po13.
^{133}Cs(^{19}F,4nγ): 1993Pi01.
^{141}Pr(^{11}B,4nγ): 2000Po13, 2003Po02, 2002Bi03.
^{148}Sm(α,4nγ): 1990Pi17, 1984Lu09, 1973Kr10.
^{148}Sm(^{3}He,3nγ): 1990Pi17, 1984Lu09.
Measured:
Eγ,Iγ,γ(θ), γγ coin, (1973Kr10,1984Lu09,1987Pi07,1990Dr06,1990Pi17), Ice (1984Lu09,1990Pi17), γ excitation functions (1984Lu09,1990Pi17), DCO ratios (1987Pi07,1990Dr06), $T_{1/2}$(1973Kr10,1987Pi07,1990Pi17,1990Dr06,1993Pi01,2003Po02).
The energy level scheme follows 1990Pi17, 1990Dr06 which supersede 1987Pi07.

^{148}Gd Levels

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	Comments
0.0[@]	0^+		
784.50[@] *10*	2^+	4.2 ps *12*	
1273.64[&] *13*	3^-	34.7 ps *21*	
1416.46[@] *13*	4^+	8.1 ps *24*	
1811.35[@] *15*	6^+	178 ps *20*	
1913.12[&] *17*	4^-		
2082.32[&] *15*	5^-	2.6 ps *13*	
2564.20[&] *17*	7^-	21.3 ps *30*	
2567.05[&] *22*	6^-		
2631.6[a] *3*	5^-		
2693.6[@] *3*	8^+	13.2 ps *28*	Configuration=$\nu(f_{7/2}h_{9/2})$ (2003Po02).
2695.05[&] *18*	9^-	16.6 ns *3*	μ=−0.162 *18* (1989Ra17,1987Da27) Q=1.01 *5* (1989Ra17,1982Ha22) $T_{1/2}$: weighted average of 17.5 ns *10* (1990Pi17), 17.5 ns *10* (1984Lu09), 16.5 ns *3* (1979Ha15), 17.3 ns *20* (1973Kr10), 16.3 ns *9* (1972HaXQ), and 16.7 ns *9* (1971HaXD).
2782.9[@] *8*			
2869.0[@] *4*	$(5)^+$		
2935.1[@] *6*	$(7)^+$		
2937.0[a] *3*	7^-	3.8 ps *26*	
3029.96[&] *20*	8^-	52 ps *13*	
3152.84[a] *20*	8^-		
3180.1[a] *6*	7^-		
3310.7[a] *4*	8^-		
3367.62[a] *21*	9^-	19.1 ps *21*	
3667.0[@] *4*	10^-		

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

^{148}Gd Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	Comments
3701.85& *23*	11^-	1 ps *+4−1*	$T_{1/2}$: 2003Po02 quote mean lifetime= 1.8 ps *57*. Configuration=$\nu(f_{7/2}h_{9/2})\otimes 3^-\otimes 3^-$ (2003Po02).
3758.61b *23*	10^+	7.6 ps *10*	
3822.8& *4*	10^+		
3918.58a *23*	10^-	8.9 ps *15*	
3980.80& *24*	12^+	60 ps *5*	$T_{1/2}$: weighted average of: 58 ps *7* (1993Pi01, plunger method); 61 ps *6* (2003Po02, also given by 2000Po13, plunger method).
4121.80a *25*	11^-	4.6 ps *34*	
4430.1a *3*	12^-	12 ps *9*	
4500.71b *23*	12^+	3.9 ps *21*	
4551.4a *3*	13^-	38 ps *6*	
4740.9a *4*	$13^{(-)}$		
4906.3a *3*	14^-	3 ps *+9−3*	$T_{1/2}$: 2003Po02 quote mean lifetime= 4 ps *13*.
5026.20b *24*	14^+	25 ps *14*	
5117.8a *3*	15^-	16 ps *8*	
5168.2& *4*	14^+		
5355.9b *3*	16^+	184 ps *26*	
5438.9a *4*	16		
5579.0			
5800.8			
5833.0b *3*	18^+		
5883.3	17		
5934.0a *8*	17		
6211.2c *4*	17		
6268.9	18		
6381.9	18		
6546.0c *4*	18^-		
6575.3	19^+		
6641.1c *4*	19^-		
6834.9b *4*	20^-	1.5 ns *3*	$T_{1/2}$: weighted average of the values (In ns): 1.5 *3* 1990Pi17 (plunger method), 1.7 *6* (2001Gu31, recoil shadow anisotropy method). Other: 1.8 ns (1990Dr06).
7051.8	19^+		
7110.8	20^+		
7156.0b *5*	21^-		
7274.6	20^+		
7334.1			
7531.3	21^+		
7791.3	22^+		
8005.3	22^-		
8243.2	22^-		
8304.9	23^-		
8309.6	23^+		
8364.5	23^-		
8455.9	23^-		
8609.6	23		
8639.5	24^-		
8832.5	24		
8987.5	25^-		
9244.0	25^-		
9259.0			
9653.1	26^-		
9758.1	26		

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

^{148}Gd Levels (continued)

E(level)†	Jπ‡	$T_{1/2}$#	Comments
9934.7			
9957.8	26^-		
10046.9	25^-		
10063.5	27		
10318.4	27^-		
10474.7	27		
10694.5	27^-		
10760.7	28		
10870.1	28		
11158.8	28		
11186.2	29		
11457.3	29		
11478.4	29^-		
11546.4	29^-		
11587.4	30		
11728.1	30		
12013.2			
12064.4	30		
12139.1	31^-		
12285.5	30		
12382.3	31		
12530.0	32		
12683.4	33		
13039.5	33		
13126.4	33^-		
13148.0	32		
13244.2			
13354.8?			
13555.4	33		
13736.3	34		
13870.3	35	1.5 ns *3*	g=+0.60 *16* (1989Ha15) $T_{1/2}$: from 2001Gu31 (recoil shadow anisotropy method). Other:≈2 ns (1990Dr06).
13888.7	33		
13911.9			
14011.7	34		
14146.2	35		
14207.0	36		
14924.8	36		
15166.1?	38		
15728.2	37		
16078.0			
16112.5	38		
16204.6?	40	<0.17 ps	$T_{1/2}$: estimated by 1990Dr06 by noting that the 1038γ is fast compared to the stopping time in the Pb target backing.
16257.8?	40		
16407.2	40		
16474.1	39		
17241.4?	40		E(level): listed as 17341.4 (1990Dr06); level energy diagram gives 17241.4.
17320.6?			
17371.2	42		
18482.1	44	<0.17 ps	$T_{1/2}$: estimated by 1990Dr06 by noting that the 1111γ is fast compared to the stopping time in the Pb target backing.
19149?	(46)		

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

^{148}Gd Levels (continued)

† From a least-squares fit to Eγ from 1990Pi17, combined with level energies from 1990Dr06.
‡ From Adopted Levels, supported by γγ(θ), excitation function, and conversion electron spectral measurements from this data set. J^π assignments for higher levels may be tentative.
# Except for the values referred In comments, all the other values are from 2003Po02.
@ Band(A): ν^2 states.
& Band(B): ν^2 x octupole states.
a Band(C): ν^2 x $\pi^{+1}\pi^{-1}$ states.
b Band(D): ν^2 x π^2 states.
c Band(E): $\nu^2\pi^2$ x octupole states.

γ(^{148}Gd)

DCO=Iγ(35°)/Iγ(90°) (1990Dr06).

E_γ †	I_γ a	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	α f	Comments
41.6		13911.9		13870.3	35			E_γ: not listed by 1990Dr06; shown in the level energy diagram.
57 d		3367.62	9^-	3310.7	8^-			I_γ: I(γ+ce) branching=5.8% (2003Po02).
74.5 b		12139.1	31^-	12064.4	30			
121.3 *1*	70	4551.4	13^-	4430.1	12^-			I_γ: 13 *2* (^{3}He,3n); 56 *6* (^{28}Si,4n); 96 *6* (α,4n). A_2=−0.19 *1*, A_4=−0.01 *2* (α,4n); A_2=−0.12 *3*, A_4=−0.02 *4* (^{3}He,3n).
122.9 *1*	15	3152.84	8^-	3029.96	8^-			E_γ: 1990Dr06 list this γ depopulating a 3135.0 level; this must be a typographical error and should read 3153.0. I_γ: 15 *2* (^{3}He,3n); 23 *3* (^{28}Si,4n); 32 *2* (α,4n). A_2=0.40 *3*, A_4=0.00 *4* (α,4n); A_2=0.37 *3*, A_4=−0.03 *5* (^{3}He,3n).
129.5 d		2693.6	8^+	2564.20	7^-			
130.1 b	78	11587.4	30	11457.3	29			DCO=0.94 *7*; for the unresolved doublet of this γ and the 130.9-keV γ from 2695 level.
130.9 *1*	206 e *5*	2695.05	9^-	2564.20	7^-	E2	0.954	α(K)=0.549 *8*; α(L)=0.313 *5*; α(M)=0.0732 *11* α(N)=0.01638 *24*; α(O)=0.00218 *4*; α(P)=2.85×10^{-5} *4* α(L)exp=0.26 *8*. I_γ: 78 *5* (^{3}He,3n); 192 *15* (^{28}Si,4n); 184 *10* (α,4n) % photon branching: 60.3% 10 (2000Po13); 61% 3 (1993Pi01). A_2=0.21 *1*, A_4=−0.05 *1* (α,4n); A_2=0.21 *1*, A_4=−0.04 *1* (^{3}He,3n). DCO=0.94 *7*; for the unresolved doublet of this γ and the 130.1-keV γ from 11587 level.
133.4 b	≈5	5934.0	17	5800.8				E_γ: not placed in 1990Pi17.
134.0 b	182	13870.3	35	13736.3	34	D @		DCO=0.66 *5*.
142.8 *1*	15	1416.46	4^+	1273.64	3^-			I_γ: 15 *2* (^{3}He,3n); 16 *2* (^{28}Si,4n); 19 *2* (α,4n). A_2=−0.23 *5*, A_4=−0.00 *7* (α,4n); A_2=−0.19 *3*, A_4=−0.08 *4* (^{3}He,3n).
151.1 b	16	8455.9	23^-	8304.9	23^-			DCO=0.56 *13*.
155.0 b	70	8987.5	25^-	8832.5	24			DCO=0.59 *7*.
169.2 *1*	13	2082.32	5^-	1913.12	4^-			I_γ: 13 *2* (^{3}He,3n); 18 *3* (^{28}Si,4n); 12 *2* (α,4n). A_2=−0.42 *8*, A_4=−0.04 *12* (α,4n); A_2=−0.34 *4*, A_4=−0.01 *6* (^{3}He,3n).

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ [†]	I_γ [a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
181.0[b]	23	13736.3	34	13555.4	33	D[@]			DCO=0.70 *11*.
183.6[b]	128	8639.5	24^-	8455.9	23^-	D[@]			DCO=0.74 *3*.
193.4[b]	81	6575.3	19^+	6381.9	18	D[@]			DCO=0.71 *5*.
193.7 *2*	145	6834.9	20^-	6641.1	19^-	D[@]			I_γ: 70 *6* (^{28}Si,4n); 29 *2* (α,4n). A_2=−0.27 *4*, A_4=0.01 *5* (α,4n). DCO=0.71 *3*.
197.2[b]	58	7531.3	21^+	7334.1					DCO=0.93 *7*.
211.5 *2*	73	5117.8	15^-	4906.3	14^-	D[@]			I_γ: 51 *4* (^{28}Si,4n); 46 *3* (α,4n). A_2=−0.10 *2*, A_4=0.05 *5* (α,4n). DCO=0.74 *6*.
212.7[b]	24	8455.9	23^-	8243.2	22^-				DCO=0.89 *11*.
214.8 *1*	29	3367.62	9^-	3152.84	8^-	M1		0.235	α(K)=0.199 *3*; α(L)=0.0284 *4*; α(M)=0.00616 *9* α(N)=0.001419 *20*; α(O)=0.000220 *3*; α(P)=1.478×10^{-5} *21* Mult.: α(K)exp=16×10^{-2} *6*; also ΔJ=1 from DCO (1990Dr06). I_γ: 16 *2* (^{3}He,3n); 24 *3* (^{28}Si,4n); 47 *3* (α,4n). A_2=−0.54 *3*, A_4=0.04 *4* (α,4n); A_2=−0.49 *4*, A_4=0.02 *6* (^{3}He,3n). DCO=0.52 *4*.
221.8[b]	13	5800.8		5579.0					E_γ: not placed in 1990Pi17.
222.9[b]	35	8832.5	24	8609.6	23				DCO=0.83 *5*; for the unresolved doublet of this γ and the 223.0-keV γ from the 7275 level.
223.0[b]	23	7274.6	20^+	7051.8	19^+				DCO=0.83 *5*; for the unresolved doublet of this γ and the 222.9-keV γ from the 8832 level.
238.0 *2*	94	5355.9	16^+	5117.8	15^-	D[@]			I_γ: 50 *4* (^{28}Si,4n); 26 *2* (α,4n). A_2=−0.26 *5*, A_4=0.02 *7* (α,4n). DCO=0.74 *3*.
241.5 *5*		2935.1	$(7)^+$	2693.6	8^+	M1		0.171	α(K)=0.1449 *22*; α(L)=0.0206 *4*; α(M)=0.00447 *7* α(N)=0.001028 *16*; α(O)=0.0001597 *25*; α(P)=1.073×10^{-5} *17* α(K)exp=12×10^{-2} *4* measurement of unresolved 241.5 keV and 243.1-keV gammas. Iγ=5 *2* (^{3}He,3n). A_2=0.33 *12*, A_4=−0.12 *7* (^{3}He,3n).
243.1 *5*		3180.1	7^-	2937.0	7^-	M1		0.168	α(K)=0.1423 *22*; α(L)=0.0202 *3*; α(M)=0.00439 *7* α(N)=0.001010 *16*; α(O)=0.0001569 *24*; α(P)=1.054×10^{-5} *16* α(K)exp=12×10^{-2} *4* measurement of unresolved 241.5 keV and 243.1-keV gammas. Iγ=5 *2* (^{3}He,3n). A_2=0.06 *9*, A_4=0.09 *13* (^{3}He,3n).
244.5[b]	38	12530.0	32	12285.5	30				DCO=1.41 *9*.
256.7[b]	206	7531.3	21^+	7274.6	20^+	D[@]			E_γ: not placed in 1990Pi17. DCO=0.84 *2*.
259.4[b]	30	6834.9	20^-	6575.3	19^+	D[@]			DCO=0.58 *6*.
260.0[b]	268	7791.3	22^+	7531.3	21^+	D[@]			Not placed in 1990Pi17. DCO=0.81 *2*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
271.1 *2*	27	2082.32	5^-	1811.35	6^+	E1+M2	≤0.23	0.034 *14*	α(K)=0.029 *11*; α(L)=0.0045 *21*; α(M)=0.0010 *5* α(N)=0.00022 *11*; α(O)=3.4×10^{-5} *16*; α(P)=2.1×10^{-6} *10* α(K)exp<0.04. I_γ: 16 *2* (^{3}He,3n); 26 *5* (α,4n). A_2=−0.16 *4*, A_4=−0.06 *5* (α,4n); A_2=−0.14 *5*, A_4=−0.02 *7* (^{3}He,3n).
271.1[b]	50	11457.3	29	11186.2	29				DCO=1.6 *15*.
271.5[b]	242	10318.4	27^-	10046.9	25^-	E2		0.0822	α(K)=0.0618 *9*; α(L)=0.01592 *23*; α(M)=0.00362 *5* α(N)=0.000818 *12*; α(O)=0.0001152 *17*; α(P)=3.79×10^{-6} *6* DCO=1.37 *6*.
278.9 *2*	410	3980.80	12^+	3701.85	11^-	E1+M2	≤0.19	0.028 *9*	α(K)=0.023 *7*; α(L)=0.0035 *13*; α(M)=0.0008 *3* α(N)=0.00018 *7*; α(O)=2.7×10^{-5} *10*; α(P)=1.7×10^{-6} *7* Mult.: α(K)exp < 3×10^{-2}; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 38 *5* (^{3}He,E(n)); 250 *25* (^{28}Si,4n); 233 *16* (α,4n). A_2=−0.27 *1*, A_4=−0.02 *1* (α,4n); A_2=−0.22 *2*, A_4=0.00 *2* (^{3}He,3n). DCO=0.70 *2*.
280.6 *5*		3310.7	8^-	3029.96	8^-				Iγ=4 *2* (^{3}He,3n). A_2=0.43 *14*, A_4=−0.05 *19* (^{3}He,3n).
285.5 *5*	27	5026.20	14^+	4740.9	$13^{(-)}$				E_γ: γ obscured by background gammas. I_γ: ≈15 (^{28}Si,4n);≈8 (α,4n). DCO=0.67 *4*.
288.9 *2*	94	6834.9	20^-	6546.0	18^-	E2[#]		0.0677	α(K)=0.0514 *8*; α(L)=0.01266 *18*; α(M)=0.00287 *4* α(N)=0.000649 *10*; α(O)=9.19×10^{-5} *13*; α(P)=3.19×10^{-6} *5* I_γ: from (^{28}Si,4n); 15 *3* (α,4n) obscured by a background γ; 53 *4* (α,4n). DCO=1.41 *5*.
294.7[b]	88	16407.2	40	16112.5	38				DCO=1.32 *6*.
295.1[b]	35	14207.0	36	13911.9					DCO=0.86 *7*.
298.5[b]	224	11457.3	29	11158.8	28	D[@]			DCO=0.73 *2*.
305.3[b]	180	10063.5	27	9758.1	26	D[@]			DCO=0.75 *10*.
306.3[b]	35	6575.3	19^+	6268.9	18				DCO=0.55 *11*.
308.4 *2*	113	4430.1	12^-	4121.80	11^-	M1		0.0888	α(K)=0.0753 *11*; α(L)=0.01062 *15*; α(M)=0.00230 *4* α(N)=0.000530 *8*; α(O)=8.24×10^{-5} *12*; α(P)=5.56×10^{-6} *8* Mult.: α(K)exp=9.8×10^{-2} *20*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 21 *2* (^{3}He,3n); 112 *7* (^{28}Si,4n); 127 *7* (α,4n). A_2=−0.10 *1*, A_4=0.01 *2* (α,4n); A_2=−0.10 *3*, A_4=−0.03 *4* (^{3}He,3n). DCO=0.86 *3*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
311.0 *4*	24	4740.9	$13^{(-)}$	4430.1	12^-	D[@]		I_γ: 44 *4* (^{28}Si,4n); 27 *4* (α,4n). A_2=−0.19 *4*, A_4=0.06 *5* (α,4n). DCO=0.68 *6*.
321.1 *3*	80	5438.9	16	5117.8	15^-			I_γ: 180 *13* (^{28}Si,4n) intensity of unresolved doublet from 7156 and 5439 levels;≈36 (α,4n). DCO=0.85 *5*.
321.1 *3*	323	7156.0	21^-	6834.9	20^-	D[@]		I_γ: 180 *13* (^{28}Si,4n) intensity of unresolved doublet from 5439 and 7156 levels;≈26 (α,4n). DCO=0.64 *2*.
329.8 *2*	713	5355.9	16^+	5026.20	14^+			I_γ: 6.2×10^2 *4* (^{28}Si,4n); 239 *12* (α,4n). A_2=0.26 *1*, A_4=−0.09 *1* (α,4n). DCO=1.33 *3*; for the unresolved doublet of this γ and the 330-keV γ from the 8640 level.
330[b]	40	8639.5	24^-	8309.6	23^+			DCO=1.33 *3*; for the unresolved doublet of this γ and the 329.8-keV γ from the 5356 level.
334.7 *3*	91	6546.0	18^-	6211.2	17	D[@]		I_γ: unresolved doublet in (α,4n); intensity obtained from the branching ratio of the 334.9 and 465.8-keV gammas. 76 *8* (^{28}Si,4n); 34 *10* (α,4n). DCO=0.74 *4*.
334.9 *2*	55	3029.96	8^-	2695.05	9^-	M1	0.0714	α(K)=0.0606 *9*; α(L)=0.00852 *12*; α(M)=0.00185 *3* α(N)=0.000425 *6*; α(O)=6.61×10^{-5} *10*; α(P)=4.46×10^{-6} *7* α(K)exp=5.7×10^{-2} *11*. I_γ: 35 *3* (^{3}He,3n), 40 *8* (^{28}Si,4n). A_2=−0.12 *2*, A_4=0.01 *3* (^{3}He,3n). DCO=0.85 *8*.
336.7[b]	248	14207.0	36	13870.3	35	D[@]		DCO=0.66 *3*.
337.7 *3*	35	3367.62	9^-	3029.96	8^-	M1	0.0699	α(K)=0.0592 *9*; α(L)=0.00833 *12*; α(M)=0.00181 *3* α(N)=0.000416 *6*; α(O)=6.46×10^{-5} *10*; α(P)=4.37×10^{-6} *7* α(K)exp=4.9×10^{-2} *15*. I_γ: 11 *2* (^{3}He,3n); 41 *10* (^{28}Si,4n); 55 *4* (α,4n). A_2=−0.76 *3*, A_4=0.04 *4* (α,4n); A_2=−0.82 *6*, A_4=0.04 *9* (^{3}He,3n). DCO=0.41 *6*.
348.0[b]	85	8987.5	25^-	8639.5	24^-			DCO=0.51 *2*.
349.8[b]	12	16078.0		15728.2	37			DCO=1.6 *4*.
355.0 *2*	63	4906.3	14^-	4551.4	13^-			I_γ: 95 *8* (^{28}Si,4n); 88 *7* (α,4n). A_2=−0.10 *2*, A_4=−0.01 *3* (^{28}Si,4n). DCO=0.83 *4*; for the unresolved doublet of this γ and the 355.8-keV γ from the 13040 level.
355.8[b]	20	13039.5	33	12683.4	33			DCO=0.83 *4*; for the unresolved doublet of this γ and the 355.0-keV γ from the 4907 level.
360.6[b]	32	10318.4	27^-	9957.8	26^-	D[@]		DCO=0.74 *5*.
373.8 *3*	22	3310.7	8^-	2937.0	7^-	M1	0.0535	α(K)=0.0454 *7*; α(L)=0.00637 *9*; α(M)=0.001380 *20* α(N)=0.000318 *5*; α(O)=4.94×10^{-5} *7*; α(P)=3.34×10^{-6} *5* Mult.: α(K)exp=5.6×10^{-2} *17*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 15 *2* (^{3}He,3n); 22 *4* (^{28}Si,4n); 23 *2* (α,4n). A_2=−0.06 *5*, A_4=0.01 *8* (α,4n); A_2=−0.11 *5*, A_4=−0.08 *7* (^{3}He,3n). DCO=0.74 *11*.
376.7[b]	13	8832.5	24	8455.9	23^-	D[@]		DCO=0.66 *11*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ [†]	I_γ [a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	α [f]	Comments
378.4 [b]	19	6211.2	17	5833.0	18^+	D [@]		DCO=0.79 *9*.
390.9 [b]	381	12530.0	32	12139.1	31^-	D [@]		DCO=0.69 *2*.
394.9 *1*	698	1811.35	6^+	1416.46	4^+	E2	0.0267	α(K)=0.0212 *3*; α(L)=0.00427 *6*; α(M)=0.000956 *14* α(N)=0.000217 *3*; α(O)=3.15×10^{-5} *5*; α(P)=1.383×10^{-6} *20* Mult.: α(K)exp=2.4×10^{-2} *4*; also ΔJ=2 from DCO (1990Dr06) assumed to be E2. I_γ: 5.6×10^2 *3* (^{3}He,3n); 6.8×10^2 *4* (^{28}Si,4n); 700 *40* (α,4n). A_2=0.21 *1*, A_4=−0.06 *1* (α,4n); A_2=0.21 *1*, A_4=−0.04 *1* (^{3}He,3n). DCO=1.41 *3*.
410.8 [b]	15	5579.0		5168.2	14^+			E_γ: not placed in 1990Pi17. DCO=0.78 *12*.
411.0 [b]	70	12139.1	31^-	11728.1	30	D [@]		DCO=0.74 *5*.
420.4 [b]	15	7531.3	21^+	7110.8	20^+			DCO=1.14 *11*.
420.6 *5*	10	4121.80	11^-	3701.85	11^-			I_γ: 21 *4* (^{28}Si,4n); 13 *2* (α,4n). A_2=0.21 *2*, A_4=−0.02 *17* (α,4n).
429.5 *3*	51	4551.4	13^-	4121.80	11^-			I_γ: 68 *6* (^{28}Si,4n); 51 *8* (α,4n). A_2=0.26 *3*, A_4=−0.08 *4* (α,4n). DCO=1.51 *21*; for the unresolved doublet of this γ and the 430.5-keV γ from the 3368 level.
430.5 *4*	21	3367.62	9^-	2937.0	7^-			I_γ: ≈7 (^{3}He,3n); 17 *4* (^{28}Si,4n); 22≈(α,4n). A_2=0.22 *3*, A_4=−0.02 *4* (α,4n); A_2=0.21 *6*, A_4=−0.06 *9* (^{3}He,3n). DCO=1.51 *21*; for the unresolved doublet of this γ and the 429.5-keV γ from the 4552 level.
435.6 [b]	46	6268.9	18	5833.0	18^+			DCO=1.35 *8*.
444.3 [b]	45	5883.3	17	5438.9	16			DCO=0.87 *6*.
447.7 [b]	76	6381.9	18	5934.0	17			DCO=0.82 *4*.
450.6 [b]	55	8455.9	23^-	8005.3	22^-			DCO=1.16 *6*.
457.9 *3*	20	3152.84	8^-	2695.05	9^-			I_γ: 8 *2* (^{3}He,3n); 14 *3* (^{28}Si,4n); 30 *3* (α,4n). A_2=−0.16 *5*, A_4=0.09 *7* (α,4n); A_2=−0.02 *7*, A_4=−0.03 *10* (^{3}He,3n). DCO=0.90 *10*.
464.2 [b]	12	13148.0	32	12683.4	33			DCO=0.99 *16*; for the unresolved doublet of this γ and the 464.5-keV γ from the 11159 level.
464.5 [b]	22	11158.8	28	10694.5	27^-			DCO=0.99 *16*; for the unresolved doublet of this γ and the 464.2-keV γ from the 13148 level.
465.8 *2*	55	3029.96	8^-	2564.20	7^-	M1	0.0303	α(K)=0.0257 *4*; α(L)=0.00358 *5*; α(M)=0.000776 *11* α(N)=0.000179 *3*; α(O)=2.78×10^{-5} *4*; α(P)=1.89×10^{-6} *3* Mult.: α(K)exp=2.8×10^{-2} *6*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 47 *4* (^{3}He,3n); 54 *8* (^{28}Si,4n); 71 *11* (α,4n). A_2=−0.18 *2*, A_4=0.01 *2* (α,4n); A_2=−0.28 *3*, A_4=0.04 *4* (^{3}He,3n). DCO=0.71 *7*.
468.2 [b]	9	8832.5	24	8364.5	23^-			DCO=0.92 *19*.
475.3 *5*	77	5026.20	14^+	4551.4	13^-	D [@]		I_γ: ≈30 (^{28}Si,4n);≈20 (α,4n). A_2=−0.15 *2*, A_4=0.05 *3* (α,4n). DCO=0.68 *3*.
477.1 *1*	732	5833.0	18^+	5355.9	16^+	E2 [#]	0.01580	α(K)=0.01280 *18*; α(L)=0.00234 *4*; α(M)=0.000521 *8*

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
									α(N)=0.0001186 *17*; α(O)=1.748×10^{-5} *25*; α(P)=8.54×10^{-7} *12* I$_\gamma$: 548 *33* (^{28}Si,4n); 181 *13* (α,4n). A$_2$=0.28 *1*, A$_4$=−0.11 *2* (α,4n). DCO=1.39 *3*.
479.4[b]	19	7531.3	21$^+$	7051.8	19$^+$				DCO=1.7 *3*.
481.9 *1*	354	2564.20	7$^-$	2082.32	5$^-$	E2		0.01538	α(K)=0.01247 *18*; α(L)=0.00227 *4*; α(M)=0.000505 *7* α(N)=0.0001150 *17*; α(O)=1.696×10^{-5} *24*; α(P)=8.33×10^{-7} *12* Mult.: α(K)exp=1.4×10^{-2} *2*; also ΔJ=2 from DCO (1990Dr06) assumed to be E2. I$_\gamma$: 164 *10* (^{3}He,3n); 3.6×10^2 *3* (^{28}Si,4n); 322 *19* (α,4n). A$_2$=0.20 *1*, A$_4$=−0.06 *1* (α,4n); A$_2$=0.24 *1*, A$_4$=−0.05 *1* (^{3}He,3n). DCO=1.38 *4*.
484.8 *2*		2567.05	6$^-$	2082.32	5$^-$	M1		0.0274	α(K)=0.0232 *4*; α(L)=0.00323 *5*; α(M)=0.000699 *10* α(N)=0.0001610 *23*; α(O)=2.51×10^{-5} *4*; α(P)=1.702×10^{-6} *24* α(K)exp=2.1×10^{-2} *9*. Iγ=4 *2* (α,4n), 16 *2* (^{3}He,3n). A$_2$=−1.2 *4*, A$_4$=0.4 *5* (α,4n); A$_2$=−0.33 *5*, A$_4$=0.04 *7* (^{3}He,3n).
489.1 *1*	340	1273.64	3$^-$	784.50	2$^+$	E1+M2	≤0.063	0.00511 *18*	α(K)=0.00436 *15*; α(L)=0.000592 *24*; α(M)=0.000128 *6* α(N)=2.93×10^{-5} *12*; α(O)=4.49×10^{-6} *19*; α(P)=2.89×10^{-7} *12* Mult.: α(K)exp=0.39×10^{-2} *6*; also ΔJ=1 transition from DCO (1990Dr06). I$_\gamma$: 312 *18* (^{3}He,3n); 272 *16* (^{28}Si,4n); 301 *18* (α,4n). A$_2$=−0.21 *1*, A$_4$=0.02 *1* (α,4n); A$_2$=−0.14 *1*, A$_4$=0.00 *1* (^{3}He,3n). DCO=0.73 *2*.
492.1[b]	15	13736.3	34	13244.2					DCO=1.16 *19*.
495.1 *6*	33	5934.0	17	5438.9	16	D[@]			I$_\gamma$: ≈19 (α,4n). A$_2$=−0.27 *4*, A$_4$=0.05 *6* (α,4n). DCO=0.68 *6*.
498.7[b]	33	6381.9	18	5883.3	17				DCO=1.13 *12*.
509.7[b]	354	13039.5	33	12530.0	32	D[@]			DCO=0.77 *2*.
511.6[b]	≈100	4430.1	12$^-$	3918.58	10$^-$				I$_\gamma$: ≈70 (α,4n). DCO=1.22 *15*.
513.9[b]	66	9758.1	26	9244.0	25$^-$	D[@]			DCO=0.75 *4*.
515.7[b]	27	7156.0	21$^-$	6641.1	19$^-$	E2		0.01287	α(K)=0.01049 *15*; α(L)=0.00186 *3*; α(M)=0.000411 *6* α(N)=9.37×10^{-5} *14*; α(O)=1.389×10^{-5} *20*; α(P)=7.05×10^{-7} *10* DCO=1.3 *3*.
518.2[b]	136	8309.6	23$^+$	7791.3	22$^+$	D[@]			DCO=0.87 *6*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
519.9 *1*	334	4500.71	12^+	3980.80	12^+	E2[#]	0.01260	α(K)=0.01028 *15*; α(L)=0.00181 *3*; α(M)=0.000401 *6* α(N)=9.15×10^{-5} *13*; α(O)=1.356×10^{-5} *19*; α(P)=6.92×10^{-7} *10* I_γ: 10 *2* (^{3}He,3n); 258 *18* (^{28}Si,4n); 118 *10* (α,4n). A_2=0.38 *2*, A_4=−0.01 *3* (α,4n); A_2=0.16 *9*, A_4=0.03 *13* (^{3}He,3n). DCO=1.45 *6*.
522.8[b]	78	8832.5	24	8309.6	23^+	D[@]		DCO=0.76 *4*.
525.5 *1*	587	5026.20	14^+	4500.71	12^+	E2[#]	0.01225	α(K)=0.01001 *14*; α(L)=0.001756 *25*; α(M)=0.000389 *6* α(N)=8.86×10^{-5} *13*; α(O)=1.315×10^{-5} *19*; α(P)=6.74×10^{-7} *10* I_γ: 6 *3* (^{3}He,3n); 5.0×10^2 *4* (^{28}Si,4n); 220 *15* (α,4n). A_2=0.31 *1*, A_4=−0.12 *1* (α,4n); A_2=0.46 *13*, A_4=−0.26 *19* (^{3}He,3n). DCO=1.40 *3*.
532.1[b]	13	5438.9	16	4906.3	14^-			DCO=1.4 *4*.
541.9[b]	21	11728.1	30	11186.2	29			DCO=1.09 *15*.
548.8[b]	27	6381.9	18	5833.0	18^+			DCO=1.15 *11*.
551.0 *2*	12	3918.58	10^-	3367.62	9^-			I_γ: ≈10 (^{3}He,3n); 25 *3* (^{28}Si,4n);≈20 (α,4n). DCO=0.82 *6*; for the unresolved doublet of this γ and the 551.8-keV γ from the 12139 level.
551.8[b]	25	12139.1	31^-	11587.4	30			DCO=0.82 *6*; for the unresolved doublet of this γ and the 551.2-keV γ from the 3919 level.
555.9[b]	28	12013.2		11457.3	29			DCO=1.54 *14*.
560.5[b]	25	10318.4	27^-	9758.1	26			DCO=0.77 *6*; for the unresolved doublet of this γ and the 561.0-keV γ from the 13244 level.
561.0[b]	16	13244.2		12683.4	33			DCO=0.77 *6*; for the unresolved doublet of this γ and the 560.5-keV γ from the 10318 level.
566.4 *2*	94	5117.8	15^-	4551.4	13^-	E2[#]	0.01012	α(K)=0.00831 *12*; α(L)=0.001415 *20*; α(M)=0.000312 *5* α(N)=7.13×10^{-5} *10*; α(O)=1.063×10^{-5} *15*; α(P)=5.63×10^{-7} *8* I_γ: 106 *10* (^{28}Si,4n); 75 *10* (α,4n). A_2=0.28 *2*, A_4=−0.05 *3* (α,4n). DCO=1.33 *6*.
571.0[b]	21	4551.4	13^-	3980.80	12^+			I_γ: ≈15 (α,4n). DCO=1.01 *12*.
573.5[b]	12	8364.5	23^-	7791.3	22^+			DCO=0.82 *14*.
578.3[b]	13	5934.0	17	5355.9	16^+			DCO=0.57 *17*.
588.3[b]	55	13736.3	34	13148.0	32			DCO=1.46 *11*.
588.6 *3*	19	3152.84	8^-	2564.20	7^-	M1	0.01675	α(K)=0.01424 *20*; α(L)=0.00197 *3*; α(M)=0.000425 *6* α(N)=9.79×10^{-5} *14*; α(O)=1.525×10^{-5} *22*; α(P)=1.039×10^{-6} *15* Mult.: α(K)exp=1.2×10^{-2} *3*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 12 *3* (^{3}He,3n); 19 *3* (^{28}Si,4n); 25 *2* (α,4n). A_2=−0.31 *8*, A_4=0.02 *12* (α,4n); A_2=−0.19 *7*, A_4=−0.05 *10* (^{3}He,3n). DCO=0.87 *19*.
592.7[b]	178	12139.1	31^-	11546.4	29^-	E2	0.00903	α(K)=0.00744 *11*; α(L)=0.001245 *18*; α(M)=0.000275 *4*

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
								α(N)=6.27×10^{-5} *9*; α(O)=9.37×10^{-6} *14*; α(P)=5.06×10^{-7} *7* DCO=1.46 *8*.
604.5[b]	95	9244.0	25$^-$	8639.5	24$^-$			DCO=0.96 *9*.
612.1[b]	8	6546.0	18$^-$	5934.0	17			
619.6[b]	19	9259.0		8639.5	24$^-$			E_γ: 1990Dr06 list this γ as depopulating a 9249 level; however, their energy level diagram shows this γ depopulating the 9259 level. The placement here follows the energy level diagram.
623.0[b]	107	8987.5	25$^-$	8364.5	23$^-$	E2	0.00799	α(K)=0.00660 *10*; α(L)=0.001086 *16*; α(M)=0.000239 *4* α(N)=5.46×10^{-5} *8*; α(O)=8.18×10^{-6} *12*; α(P)=4.50×10^{-7} *7* DCO=1.42 *7*.
632.0 *1*	678	1416.46	4$^+$	784.50	2$^+$	E2	0.00772	α(K)=0.00638 *9*; α(L)=0.001044 *15*; α(M)=0.000230 *4* α(N)=5.25×10^{-5} *8*; α(O)=7.87×10^{-6} *11*; α(P)=4.36×10^{-7} *6* Mult.: α(K)exp=0.59×10^{-2} *9*; also ΔJ=2 from DCO (1990Dr06); assumed to be E2. I_γ: 6.3×10^2 *4* (^{3}He,3n); 7.0×10^2 *4* (^{28}Si,4n); 710 *40* (α,4n). A_2=0.21 *1*, A_4=−0.06 *1* (α,4n); A_2=0.22 *1*, A_4=−0.04 *1* (^{3}He,3n). DCO=1.41 *4*.
634.3[b]	97	8639.5	24$^-$	8005.3	22$^-$			DCO=1.26 *7*.
639.4 *2*	11	1913.12	4$^-$	1273.64	3$^-$	M1	0.01362	α(K)=0.01159 *17*; α(L)=0.001595 *23*; α(M)=0.000345 *5* α(N)=7.94×10^{-5} *12*; α(O)=1.237×10^{-5} *18*; α(P)=8.44×10^{-7} *12* Mult.: α(K)exp=0.80×10^{-2} *15*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 54 *5* (^{3}He,3n); 17 *4* (α,4n). A_2=−0.67 *9*, A_4=0.05 *12* (α,4n); A_2=−0.42 *3*, A_4=0.01 *4* (^{3}He,3n). DCO=0.71 *20*.
653.6 *5*		2567.05	6$^-$	1913.12	4$^-$	E2	0.00712	α(K)=0.00590 *9*; α(L)=0.000954 *14*; α(M)=0.000210 *3* α(N)=4.79×10^{-5} *7*; α(O)=7.20×10^{-6} *11*; α(P)=4.03×10^{-7} *6* α(K)exp=0.7×10^{-2} *3*. Iγ=6 *2* (^{3}He,3n). A_2=0.10 *15*, A_4=−0.01 *22* (^{3}He,3n).
657.2[b]	94	13039.5	33	12382.3	31			DCO=1.43 *6*.
660.7[b]	85	12139.1	31$^-$	11478.4	29$^-$	E2	0.00694	α(K)=0.00575 *8*; α(L)=0.000927 *13*; α(M)=0.000204 *3* α(N)=4.65×10^{-5} *7*; α(O)=7.00×10^{-6} *10*; α(P)=3.93×10^{-7} *6* DCO=1.45 *7*.
664.6[b]	75	8455.9	23$^-$	7791.3	22$^+$	D[@]		DCO=0.69 *8*.
665[b]	30	10318.4	27$^-$	9653.1	26$^-$			DCO=0.96 *7*; for the unresolved triplet of this γ and the 665.7-keV γ from the 9653 level and the 666.0-keV γ from the 2082 level.
665.7[b]	152	9653.1	26$^-$	8987.5	25$^-$			DCO=0.96 *7*; for the unresolved triplet of this γ and the 665-keV γ from the 10318 level and the 666.0-keV γ from the 2082 level.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ [†]	I_γ [a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
666.0 *4*	22	2082.32	5^-	1416.46	4^+	E1+M2	≤0.34	0.0042 *17*	α(K)=0.0036 *14*; α(L)=0.00051 *22*; α(M)=0.00011 *5* α(N)=2.5×10^{-5} *11*; α(O)=3.9×10^{-6} *17*; α(P)=2.6×10^{-7} *12* α(K)exp<0.5×10^{-2}. I_γ: 24 *4* (^{3}He,3n); 22 *4* (α,4n). A_2=−0.30 *8*, A_4=−0.13 *11* (α,4n); A_2=−0.05 *4*, A_4=0.03 *6* (^{3}He,3n). DCO=0.96 *7*; for the unresolved triplet of this γ and the 665-keV γ from the 10318 level and the 665.7-keV γ from the 9653 level.
[x]666.3 *3*	185 *15*								
667[bch]		19149?	(46)	18482.1	44				
670.0[b]	29	7051.8	19^+	6381.9	18	D[@]			DCO=0.74 *14*.
673.9 *3*	61	3367.62	9^-	2693.6	8^+	E1+M2	≤0.41	0.0047 *23*	α(K)=0.0040 *19*; α(L)=0.0006 *3*; α(M)=0.00012 *7* α(N)=2.9×10^{-5} *15*; α(O)=4.4×10^{-6} *23*; α(P)=2.9×10^{-7} *15* Mult.: α(K)exp<0.6×10^{-2}; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 14 *4* (^{3}He,3n); 46 *5* (^{28}Si,4n); 45 *6* (α,4n). A_2=−0.21 *4*, A_4=0.03 *6* (α,4n); A_2=−0.09 *7*, A_4=−0.09 *11* (^{3}He,3n). DCO=0.88 *5*.
677.9 *3*	57	4500.71	12^+	3822.8	10^+	E2[#]		0.00653	α(K)=0.00542 *8*; α(L)=0.000866 *13*; α(M)=0.000190 *3* α(N)=4.35×10^{-5} *7*; α(O)=6.55×10^{-6} *10*; α(P)=3.71×10^{-7} *6* I_γ: 43 *5* (^{28}Si,4n); 26 *4* (α,4n). A_2=0.22 *7*, A_4=−0.03 *10*. DCO=1.41 *15*.
680.5[b]	25	7791.3	22^+	7110.8	20^+	E2		0.00647	α(K)=0.00537 *8*; α(L)=0.000857 *12*; α(M)=0.000188 *3* α(N)=4.30×10^{-5} *6*; α(O)=6.48×10^{-6} *9*; α(P)=3.68×10^{-7} *6* DCO=1.34 *15*.
684.1[b]	35	11158.8	28	10474.7	27				DCO=1.10 *8*.
696.7[b]	282	13736.3	34	13039.5	33	D[@]			DCO=0.75 *2*; for the unresolved doublet of this γ and the 697-keV γ from the 10761 level made of mostly this γ.
697[b]	≈20	10760.7	28	10063.5	27				DCO=0.75 *2*; for the unresolved doublet of this γ and the 696.7-keV γ from the 13736 level.
699.3[b]	163	7274.6	20^+	6575.3	19^+				E_γ: not placed in 1990Pi17. DCO=1.09 *4*.
713.7[b]	28	9957.8	26^-	9244.0	25^-				DCO=1.01 *12*.
716.6[b]	35	10474.7	27	9758.1	26				DCO=1.02 *8*.
727.9 *5*	23	4430.1	12^-	3701.85	11^-				I_γ: 23 *3* (^{28}Si,4n); 23 *4* (α,4n). A_2=−0.17 *8*, A_4=−0.03 *11* (α,4n). DCO=1.23 *19*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
742.1 *1*	253	4500.71	12^+	3758.61	10^+	E2[#]	0.00529	α(K)=0.00441 *7*; α(L)=0.000686 *10*; α(M)=0.0001501 *21* α(N)=3.43×10^{-5} *5*; α(O)=5.20×10^{-6} *8*; α(P)=3.03×10^{-7} *5* I$_\gamma$: 7 *2* (^{3}He,3n); 276 *19* (^{28}Si,4n); 105 *9* (α,4n). A$_2$=0.28 *2*, A$_4$=−0.08 *3* (α,4n); A$_2$=0.06 *13*, A$_4$=0.04 *19* (^{3}He,3n). DCO=1.34 *6*.
742.1[b]	131	6575.3	19^+	5833.0	18^+			DCO=1.03 *9*.
752.9 *2*	242	2564.20	7^-	1811.35	6^+	E1[@]	0.00197	α(K)=0.001687 *24*; α(L)=0.000223 *4*; α(M)=4.79×10^{-5} *7* α(N)=1.100×10^{-5} *16*; α(O)=1.699×10^{-6} *24*; α(P)=1.127×10^{-7} *16* α(K)exp=0.26×10^{-2} *10* measurement for unresolved 752.9 and 754.2 gammas. I$_\gamma$: 107 *11* (^{3}He,3n); 201 *20* (^{28}Si,4n); 182 *18* (α,4n). A$_2$=−0.16 *1*, A$_4$=0.03 *2* (α,4n); A$_2$=−0.20 *1*, A$_4$=0.04 *2* (^{3}He,3n). DCO=0.77 *5*.
754.2 *2*	185	4121.80	11^-	3367.62	9^-	E2[#]	0.00509	α(K)=0.00425 *6*; α(L)=0.000658 *10*; α(M)=0.0001441 *21* α(N)=3.30×10^{-5} *5*; α(O)=4.99×10^{-6} *7*; α(P)=2.93×10^{-7} *4* α(K)exp=0.26×10^{-2} *10* measurement for unresolved 752.9 and 754.2 gammas. I$_\gamma$: 31 *5* (^{3}He,3n); 200 *20* (^{28}Si,4n); 187 *18* (α,4n). A$_2$=0.22 *1*, A$_4$=−0.12 *2* (α,4n); A$_2$=0.48 *6*, A$_4$=−0.25 *8* (^{3}He,3n). DCO=1.32 *11*.
755.6 *4*		2567.05	6^-	1811.35	6^+			Iγ=19 *4* (^{3}He,3n). A$_2$=0.04 *8*, A$_4$=0.12 *10* (^{3}He,3n).
758.7[b]	53	7334.1		6575.3	19^+			DCO=1.44 *13*.
765.7 *2*	45	3918.58	10^-	3152.84	8^-	E2	0.00492	α(K)=0.00411 *6*; α(L)=0.000634 *9*; α(M)=0.0001387 *20* α(N)=3.17×10^{-5} *5*; α(O)=4.81×10^{-6} *7*; α(P)=2.83×10^{-7} *4* α(K)exp=0.43×10^{-2} *17*. I$_\gamma$: 29 *4* (^{3}He,3n); 70 *7* (^{28}Si,4n); 55 *5* (α,4n). A$_2$=0.24 *3*, A$_4$=−0.11 *5* (α,4n); A$_2$=0.15 *4*, A$_4$=−0.01 *6* (^{3}He,3n). DCO=1.20 *13*.
765.8[b]	30	13148.0	32	12382.3	31			DCO=1.01 *16*.
770.7[b]	122	9758.1	26	8987.5	25^-	D[@]		DCO=0.70 *3*.
778.6[b]	108	14924.8	36	14146.2	35			DCO=1.72 *7*.
784.5 *1*	1000	784.50	2^+	0.0	0^+	E2	0.00466	α(K)=0.00390 *6*; α(L)=0.000597 *9*; α(M)=0.0001304 *19* α(N)=2.99×10^{-5} *5*; α(O)=4.53×10^{-6} *7*; α(P)=2.68×10^{-7} *4* Mult.: α(K)exp=0.35×10^{-2} *4*; also ΔJ=2 from DCO (1990Dr06) assumed to be E2. A$_2$=0.23 *1*, A$_4$=−0.07 *1* (α,4n); A$_2$=−0.21 *1*, A$_4$=−0.03 *1* (^{3}He,3n). DCO=1.44 *3*.
787.9[b]	35	10046.9	25^-	9259.0				DCO=1.36 *11*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
798.9[b]	29	4500.71	12^+	3701.85	11^-				DCO=0.63 *5*.
803.4[b]	28	3367.62	9^-	2564.20	7^-				I_γ: ≈24 (α,4n). DCO=1.13 *10*; for the unresolved doublet of this γ and another γ of the same energy from the 15728 level.
803.4[b]	16	15728.2	37	14924.8	36				DCO=1.13 *10*; for the unresolved doublet of this γ and another γ of the same energy from the 3368 level.
807[b]	≈20	10870.1	28	10063.5	27				
808.1 *2*	197	6641.1	19^-	5833.0	18^+	D[@]			I_γ: from (^{28}Si,4n);≈50 (α,4n) since it could not be resolved from the stronger 808.7-keV γ; 150 *30* (α,4n). DCO=0.62 *7*.
808.7 *1*	305	2082.32	5^-	1273.64	3^-	E2		0.00435	α(K)=0.00365 *6*; α(L)=0.000554 *8*; α(M)=0.0001210 *17* α(N)=2.77×10^{-5} *4*; α(O)=4.21×10^{-6} *6*; α(P)=2.51×10^{-7} *4* Mult.: α(K)exp=0.35×10^{-2} *5*; also ΔJ=2 from DCO (1990Dr06) assumed to be E2. I_γ: 191 *13* (^{3}He,3n); 2.7×10^2 *3* (^{28}Si,4n); 238 *24* (α,4n). A_2=0.22 *1*, −0.06 *1* (^{3}He,3n). DCO=1.45 *17*.
816.0[b]	12	5934.0	17	5117.8	15^-				DCO=0.68 *15*.
818.2[b]	43	8609.6	23	7791.3	22^+				DCO=0.73 *6*.
820.3 *4*		2631.6	5^-	1811.35	6^+	E1+M2	≤0.34	0.0026 *10*	α(K)=0.0022 *8*; α(L)=0.00030 *12*; α(M)=7.E−5 *3* α(N)=1.5×10^{-5} *6*; α(O)=2.3×10^{-6} *10*; α(P)=1.6×10^{-7} *6* α(K)exp=0.2×10^{-2} *1*. Iγ=8 *3* (^{3}He,3n). A_2=0.15 *13*, A_4=0.03 *18* (^{3}He,3n).
824.8[bc]	≈20	13354.8?		12530.0	32				
828.0[b]	14	12285.5	30	11457.3	29	D[@]			DCO=0.71 *14*.
834.2[b]	8	17241.4?	40	16407.2	40				DCO=1.2 *3*.
840.4[b]	183	11158.8	28	10318.4	27^-	D[@]			DCO=0.70 *2*.
846.5[b]	15	17320.6?		16474.1	39				DCO=0.75 *9*.
849.2[b]	12	8005.3	22^-	7156.0	21^-				DCO=1.10 *9*; for the unresolved doublet of this γ and another γ of the same energy from the 13889 level.
849.2[b]	28	13888.7	33	13039.5	33				DCO=1.10 *9*; for the unresolved doublet of this γ and another γ of the same energy from the 8005 level.
851.9[b]	96	11546.4	29^-	10694.5	27^-				DCO=1.30 *7*.
855.3 *3*	75	6211.2	17	5355.9	16^+				I_γ: 40 *5* (^{28}Si,4n); 23 *3* (α,4n). A_2=−0.48 *4*, A_4=0.09 *14* (α,4n). DCO=0.70 *4*.
858.0[b]	20	11728.1	30	10870.1	28				DCO=1.13 *18*.
878.4[b]	44	12064.4	30	11186.2	29				DCO=0.65 *5*.
882.2 *3*	80	2693.6	8^+	1811.35	6^+	E2		0.00360	α(K)=0.00302 *5*; α(L)=0.000449 *7*; α(M)=9.79×10^{-5} *14*

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
								α(N)=2.24×10^{-5} *4*; α(O)=3.42×10^{-6} *5*; α(P)=2.09×10^{-7} *3* α(K)exp=0.50×10^{-2} *8* unresolved measurement for the 882 and 884-keV gammas from the 2694 and 2695 levels, respectively. I_γ: 77 *9* (^{3}He,3n); 85 *20* (^{28}Si,4n); 77 *15* (α,4n). A_2=0.31 *3*, A_4=−0.04 *4* (α,4n); A_2=0.23 *1*, A_4=−0.04 *2* (^{3}He,3n). DCO=1.53 *21*.
883.6 *2*	312[e] *5*	2695.05	9$^-$	1811.35	6$^+$	E3	0.00802	α(K)=0.00650 *10*; α(L)=0.001186 *17*; α(M)=0.000264 *4* α(N)=6.04×10^{-5} *9*; α(O)=9.02×10^{-6} *13*; α(P)=4.76×10^{-7} *7* α(K)exp=0.50×10^{-2} *8* for the 882 and 884-keV gammas from the 2694 and 2695 levels, respectively. I_γ: 106 *10* (^{3}He,3n); 3.3×10^2 *3* (^{28}Si,4n); 255 *25* (α,4n); % photon branching: 39.7% 10 (2000Po13); 39% 3 (1993Pi01). A_2=0.40 *1*, A_4=0.02 *1* (α,4n); A_2=0.40 *1*, A_4=0.01 *2* (^{3}He,3n). DCO=1.59 *10*.
888.6 *3*	33	3918.58	10$^-$	3029.96	8$^-$			α(K)exp=0.4×10^{-2} *2*. I_γ: 8 *2* (^{3}He,3n); 38 *5* (^{28}Si,4n); 23 *3* (α,4n). A_2=0.32 *9*, A_4=−0.12 *13* (α,4n); A_2=0.01 *11*, A_4=−0.18 *15* (^{3}He,3n). DCO=0.85 *10*.
895[b]	16	9259.0		8364.5	23$^-$			
925.0[b]	160	12382.3	31	11457.3	29			DCO=1.37 *6*.
942.6[b]	71	12530.0	32	11587.4	30			DCO=1.62 *12*.
959.1[b]	150	15166.1?	38	14207.0	36	E2	0.00301	α(K)=0.00253 *4*; α(L)=0.000370 *6*; α(M)=8.05×10^{-5} *12* α(N)=1.84×10^{-5} *3*; α(O)=2.82×10^{-6} *4*; α(P)=1.753×10^{-7} *25* DCO=1.42 *7*.
964.0[b]	18	17371.2	42	16407.2	40			DCO=1.2 *3*.
967.4[b]	27	11728.1	30	10760.7	28			DCO=1.46 *17*.
971.9 *3*		3667.0	10$^-$	2695.05	9$^-$	M1	0.00490	α(K)=0.00417 *6*; α(L)=0.000566 *8*; α(M)=0.0001223 *18* α(N)=2.82×10^{-5} *4*; α(O)=4.39×10^{-6} *7*; α(P)=3.02×10^{-7} *5* α(K)exp=0.39×10^{-2}. I_γ: ≈24 (^{3}He,3n) estimated from coincidence data, since this was an unresolved doublet in this reaction; 29 *4* (α,4n). A_2=0.00 *7*, A_4=0.02 *10* (α,4n).
972		2782.9		1811.35	6$^+$			E_γ: unresolved doublet in (^{3}He,3n) reaction. Iγ<4 (α,4n),≈5 (^{3}He,3n).
972.2[b]	34	14011.7	34	13039.5	33			DCO=0.83 *12*.
987.3[b]	33	13126.4	33$^-$	12139.1	31$^-$			DCO=1.34 *11*.
1001.9 *3*	229	6834.9	20$^-$	5833.0	18$^+$			I_γ: 246 *20* (^{28}Si,4n); 30 *4* (α,4n). A_2=0.24 *6*, A_4=−0.26 *9* (α,4n). DCO=1.26 *4*.

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
1006.8 *2*	422	3701.85	11^-	2695.05	9^-	E2		0.00271	α(K)=0.00229 *4*; α(L)=0.000331 *5*; α(M)=7.20×10^{-5} *10* α(N)=1.650×10^{-5} *24*; α(O)=2.53×10^{-6} *4*; α(P)=1.587×10^{-7} *23* Mult.: α(K)exp=0.22×10^{-2} *4*; also ΔJ=2 from DCO (1990Dr06) assumed to be E2. I_γ: 78 *8* (^{3}He,3n); 3.8×10^2 *3* (^{28}Si,4n); 270 *20* (α,4n). A_2=0.29 *1*, A_4=−0.09 *1* (α,4n); A_2=0.35 *2*, A_4=−0.10 *3* (^{3}He,3n). DCO=1.39 *4*.
1009.3[b]	18	13148.0	32	12139.1	31^-				DCO=1.05 *23*.
1025.6[b]	31	13555.4	33	12530.0	32				DCO=0.79 *9*.
1036.1[b]	29	14924.8	36	13888.7	33				DCO=0.89 *8*.
1038.5[bc]	>20	16204.6?	40	15166.1?	38				DCO=0.95>.
1041.5[b]	111	10694.5	27^-	9653.1	26^-				DCO=1.18 *7*.
1045.3 *3*	39	5026.20	14^+	3980.80	12^+				I_γ: 45 *5* (^{28}Si,4n); 25 *4* (α,4n). A_2=0.29 *8*, A_4=−0.00 *11* (α,4n). DCO=1.33 *13*.
1057.6 *3*		2869.0	$(5)^+$	1811.35	6^+	M1		0.00400	α(K)=0.00341 *5*; α(L)=0.000462 *7*; α(M)=9.97×10^{-5} *14* α(N)=2.29×10^{-5} *4*; α(O)=3.58×10^{-6} *5*; α(P)=2.46×10^{-7} *4* α(K)exp=0.24×10^{-2} *6*. Iγ=14 *3* (^{3}He,3n). A_2=0.04 *11*, A_4=0.03 *15* (^{3}He,3n).
1063.6 *2*	260	3758.61	10^+	2695.05	9^-	E1+M2	≤0.18	0.00115 *14*	α(K)=0.00098 *12*; α(L)=0.000130 *17*; α(M)=2.8×10^{-5} *4* α(N)=6.4×10^{-6} *9*; α(O)=1.00×10^{-6} *14*; α(P)=6.7×10^{-8} *9* Mult.: α(K)exp=0.09×10^{-2} *2*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 30 *5* (^{3}He,3n); 223 *18* (^{28}Si,4n); 130 *20* (α,4n). A_2=−0.17 *2*, A_4=0.12 *3* (α,4n); A_2=−0.13 *4*, A_4=0.05 *5* (^{3}He,3n). DCO=0.71 *2*.
1091.7[bc]	>10	16257.8?	40	15166.1?	38				DCO>1.23.
1096.0[b]	57	12683.4	33	11587.4	30				DCO=1.4 *3*.
1102.2[b]	24	9934.7		8832.5	24				DCO=1.45 *18*.
1106.7[b]	132	14146.2	35	13039.5	33	E2		0.00223	α(K)=0.00189 *3*; α(L)=0.000269 *4*; α(M)=5.83×10^{-5} *9* α(N)=1.336×10^{-5} *19*; α(O)=2.05×10^{-6} *3*; α(P)=1.310×10^{-7} *19*; α(IPF)=3.83×10^{-7} *6* DCO=1.34 *5*.
1110.9[bc]	>10	18482.1	44	17371.2	42				DCO=0.94>.
1122.6[b]	122	11186.2	29	10063.5	27	E2		0.00217	α(K)=0.00184 *3*; α(L)=0.000260 *4*; α(M)=5.65×10^{-5} *8* α(N)=1.295×10^{-5} *19*; α(O)=1.99×10^{-6} *3*;

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(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[&g]	α[f]	Comments
									α(P)=1.273×10^{-7} *18*; α(IPF)=6.88×10^{-7} *10* DCO=1.40 *8*.
1125.6 *3*	35	2937.0	7$^-$	1811.35	6$^+$	E1+M2	≤0.14	0.00099 *8*	α(K)=0.00084 *7*; α(L)=0.000111 *9*; α(M)=2.38×10^{-5} *20* α(N)=5.5×10^{-6} *5*; α(O)=8.5×10^{-7} *7*; α(P)=5.7×10^{-8} *5*; α(IPF)=4.33×10^{-6} *9* Mult.: α(K)exp=0.07×10^{-2} *2*; also ΔJ=1 transition from DCO (1990Dr06). I_γ: 50 *5* (^{3}He,3n); 49 *6* (α,4n). A_2=−0.20 *5*, A_4=0.01 *6* (α,4n); A_2=−0.15 *3*, A_4=−0.00 *4* (^{3}He,3n). DCO=0.68 *17*.
1126.5[b]	33	12285.5	30	11158.8	28				DCO=1.50 *24*.
1127.5	28	3822.8	10$^+$	2695.05	9$^-$				I_γ: 13 *4* (α,4n). DCO=0.80 *20*.
1129.1	8	3822.8	10$^+$	2693.6	8$^+$				I_γ: 4 *1* (α,4n). DCO=1.2 *4*.
1148.8[b]	39	8304.9	23$^-$	7156.0	21$^-$				DCO=1.62 *17*.
1160.0[b]	108	11478.4	29$^-$	10318.4	27$^-$	E2		0.00203	α(K)=0.001720 *24*; α(L)=0.000243 *4*; α(M)=5.26×10^{-5} *8* α(N)=1.206×10^{-5} *17*; α(O)=1.86×10^{-6} *3*; α(P)=1.193×10^{-7} *17*; α(IPF)=2.19×10^{-6} *3* DCO=1.32 *7*.
1170.5[b]	170	8005.3	22$^-$	6834.9	20$^-$	E2		0.00200	α(K)=0.001690 *24*; α(L)=0.000238 *4*; α(M)=5.15×10^{-5} *8* α(N)=1.183×10^{-5} *17*; α(O)=1.82×10^{-6} *3*; α(P)=1.172×10^{-7} *17*; α(IPF)=2.88×10^{-6} *4* E_γ: not placed in 1990Pi17. DCO=1.32 *6*.
1187.4 *3*	14	5168.2	14$^+$	3980.80	12$^+$				I_γ: 24 *4* (^{28}Si,4n); 24 *3* (α,4n). A_2=0.32 *16*, A_4=−0.10 *22* (α,4n). DCO=1.32 *7*; for the unresolved doublet of this γ and the 1187.7-keV γ from the 16112 level.
1187.7[b]	107	16112.5	38	14924.8	36				DCO=1.32 *7*; for the unresolved doublet of this γ and the 1187.4-keV γ from the 5168 level.
1208.2[b]	264	8364.5	23$^-$	7156.0	21$^-$	E2		0.00188	α(K)=0.001587 *23*; α(L)=0.000222 *4*; α(M)=4.81×10^{-5} *7* α(N)=1.105×10^{-5} *16*; α(O)=1.702×10^{-6} *24*; α(P)=1.101×10^{-7} *16*; α(IPF)=6.42×10^{-6} *9* E_γ: not placed in 1990Pi17. DCO=1.42 *6*.
1215.2 *4*		2631.6	5$^-$	1416.46	4$^+$	E1+M2	≤0.37	0.0012 *4*	α(K)=0.0010 *3*; α(L)=0.00013 *5*; α(M)=2.9×10^{-5} *10* α(N)=6.6×10^{-6} *23*; α(O)=1.0×10^{-6} *4*; α(P)=7.0×10^{-8} *24*; α(IPF)=2.95×10^{-5} *19* α(K)exp<0.13×10^{-2}. A_2=−0.06 *7*, A_4=0.05 *10* (^{3}He,3n). Iγ=15 *4* (^{3}He,3n).
1218.6[b]	16	7051.8	19$^+$	5833.0	18$^+$				DCO=1.9 *5*.
1227.9[b]	126	11546.4	29$^-$	10318.4	27$^-$	E2		0.00182	α(K)=0.001537 *22*; α(L)=0.000215 *3*;

Continued on next page (footnotes at end of table)

(HI,xnγ) 1990Dr06,1990Pi17 (continued)

γ(^{148}Gd) (continued)

E_γ[†]	I_γ[a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[f]	Comments
								α(M)=4.65×10^{-5} *7* α(N)=1.068×10^{-5} *15*; α(O)=1.645×10^{-6} *23*; α(P)=1.066×10^{-7} *15*; α(IPF)=8.84×10^{-6} *13* DCO=1.45 *7*.
1273.5	2.95 *24*	1273.64	3$^-$	0.0	0$^+$	[E3]	0.00338	α(K)=0.00281 *4*; α(L)=0.000440 *7*; α(M)=9.64×10^{-5} *14* α(N)=2.21×10^{-5} *3*; α(O)=3.37×10^{-6} *5*; α(P)=2.04×10^{-7} *3*; α(IPF)=4.74×10^{-6} *7* E_γ: from 2003Po02; also observed by 2000Po13. I_γ: from 2002Bi03 measured branching ratios Iγ(1273γ)=0.86% 7 and Iγ(489γ)=99.14% 7 and relative intensity of $I\gamma_{rel}$=489γ; 2002Bi03 supersede Iγ(1273γ)=0.85% 11 (2000Po13).
1277.5[b]	47	7110.8	20$^+$	5833.0	18$^+$			DCO=1.46 *15*.
1285.6 *5*	10	3980.80	12$^+$	2695.05	9$^-$	E3	0.00331	α(K)=0.00276 *4*; α(L)=0.000429 *6*; α(M)=9.41×10^{-5} *14* α(N)=2.16×10^{-5} *3*; α(O)=3.29×10^{-6} *5*; α(P)=2.00×10^{-7} *3*; α(IPF)=5.48×10^{-6} *9* I_γ: branching estimated to be 2.6% 2 (2000Po13); 2.8% 2 (1993Pi01); 11 *3* (α,4n). DCO=1.2 *4*. Additional information 1.
1308.0[b]	21	16474.1	39	15166.1?	38			DCO=0.96 *18*.
1330.6[b]	19	10318.4	27$^-$	8987.5	25$^-$			DCO=0.80 *23*.
1340.3[b]	35	13870.3	35	12530.0	32			DCO=1.58 *25*.
1357.8 *4*		2631.6	5$^-$	1273.64	3$^-$			Iγ=7 *2* (^{3}He,3n). A_2=0.31 *20*, A_4=−0.03 *28* (^{3}He,3n).
1366		2782.9		1416.46	4$^+$			Iγ≈8 (^{3}He,3n).
1408.4[b]	27	8243.2	22$^-$	6834.9	20$^-$			DCO=1.61 *25*.
1682.4[b]	143	10046.9	25$^-$	8364.5	23$^-$			DCO=1.45 *8*.
1741.8[b]	11	10046.9	25$^-$	8304.9	23$^-$			DCO=1.3 *4*.

[†] From 1990Pi17 (data with uncertainties) and 1990Dr06, unless mentioned otherwise.
[‡] From γγ(θ) and conversion electron data (1990Pi17), unless indicated otherwise.
[#] ΔJ=2 transition from DCO (1990Dr06); assumed to be E2 (quoted typical value for stretched quadrupole is 1,39).
[@] ΔJ=1 transition from DCO (1990Dr06) (quoted typical value for pure stretched dipole is 0.71).
[&] Estimated from α(K)exp (1990Pi17).
[a] Relative intensity from (^{36}S,4nγ) (1990Dr06).
[b] From (^{36}S,4nγ) (1990Dr06).
[c] Transition fast compared to the recoil stopping time in the Pb target backing.
[d] Measured only by 2003Po02 (quoting Eγ from 2000Bh03).
[e] I(131γ)+I(884γ)=190+328=518 (1990Dr06) decaying 2595, 9$^-$ was divided according with % photon branching: 60.3% 10 for 131γ and 39.7% 10 for 884γ (2000Po13).
[f] Additional information 2.
[g] If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
[h] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

(HI,xnγ) 1990Dr06,1990Pi17

Level Scheme

Intensities: Relative I_γ

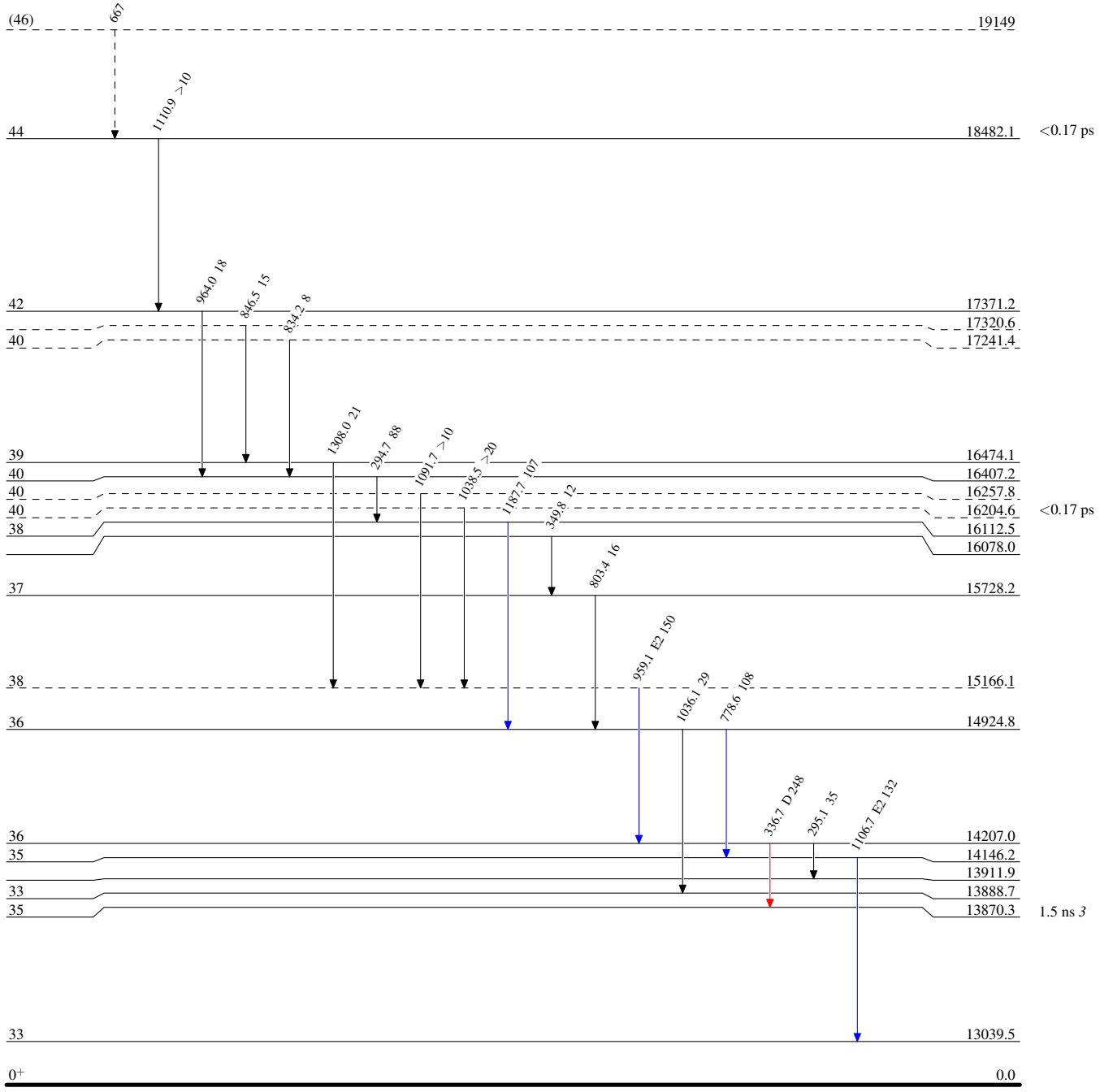
Legend

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

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

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

γ Decay (Uncertain)



$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17

Level Scheme (continued)

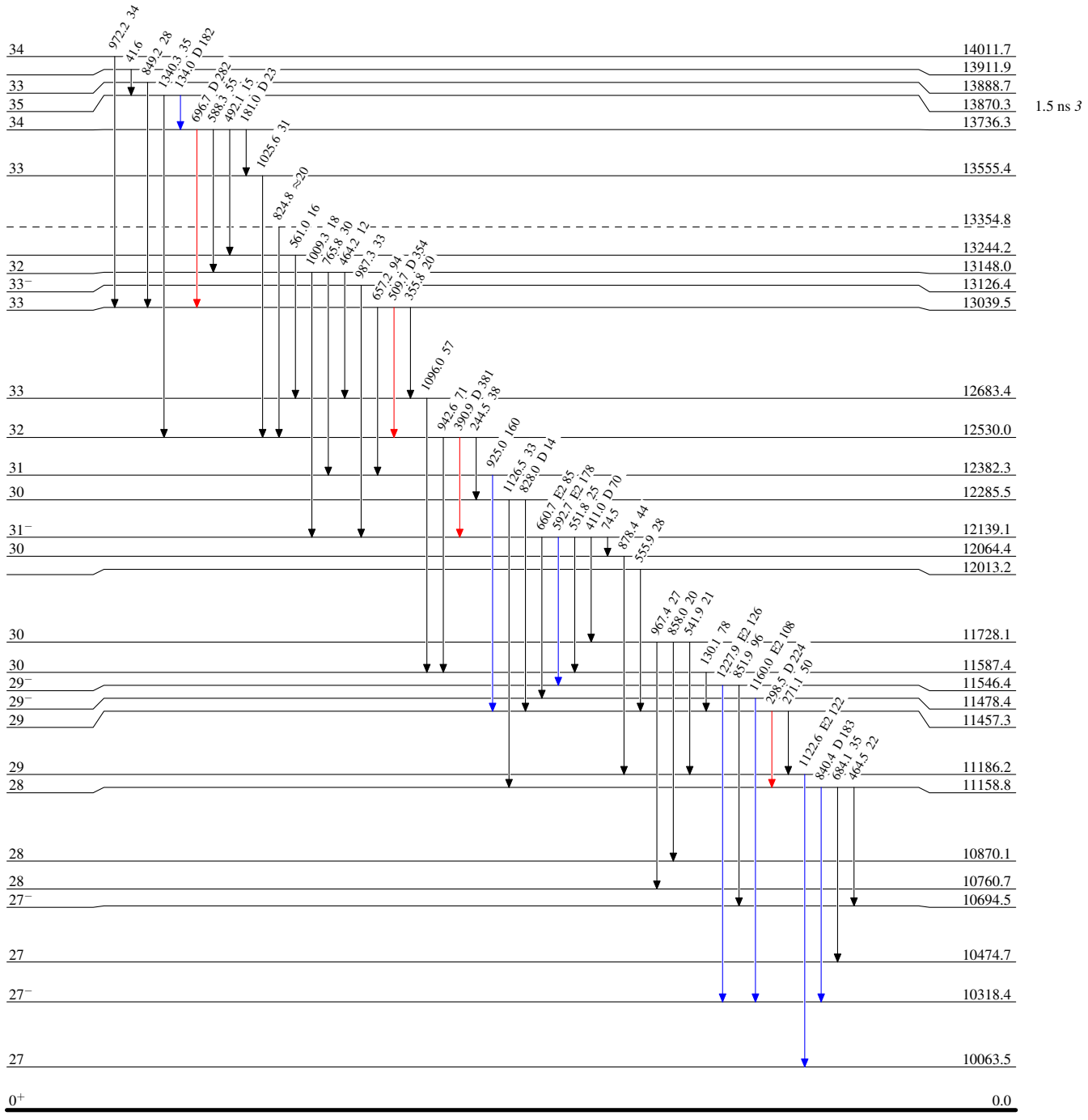
Intensities: Relative I_γ

Legend

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

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

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



$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17

Level Scheme (continued)

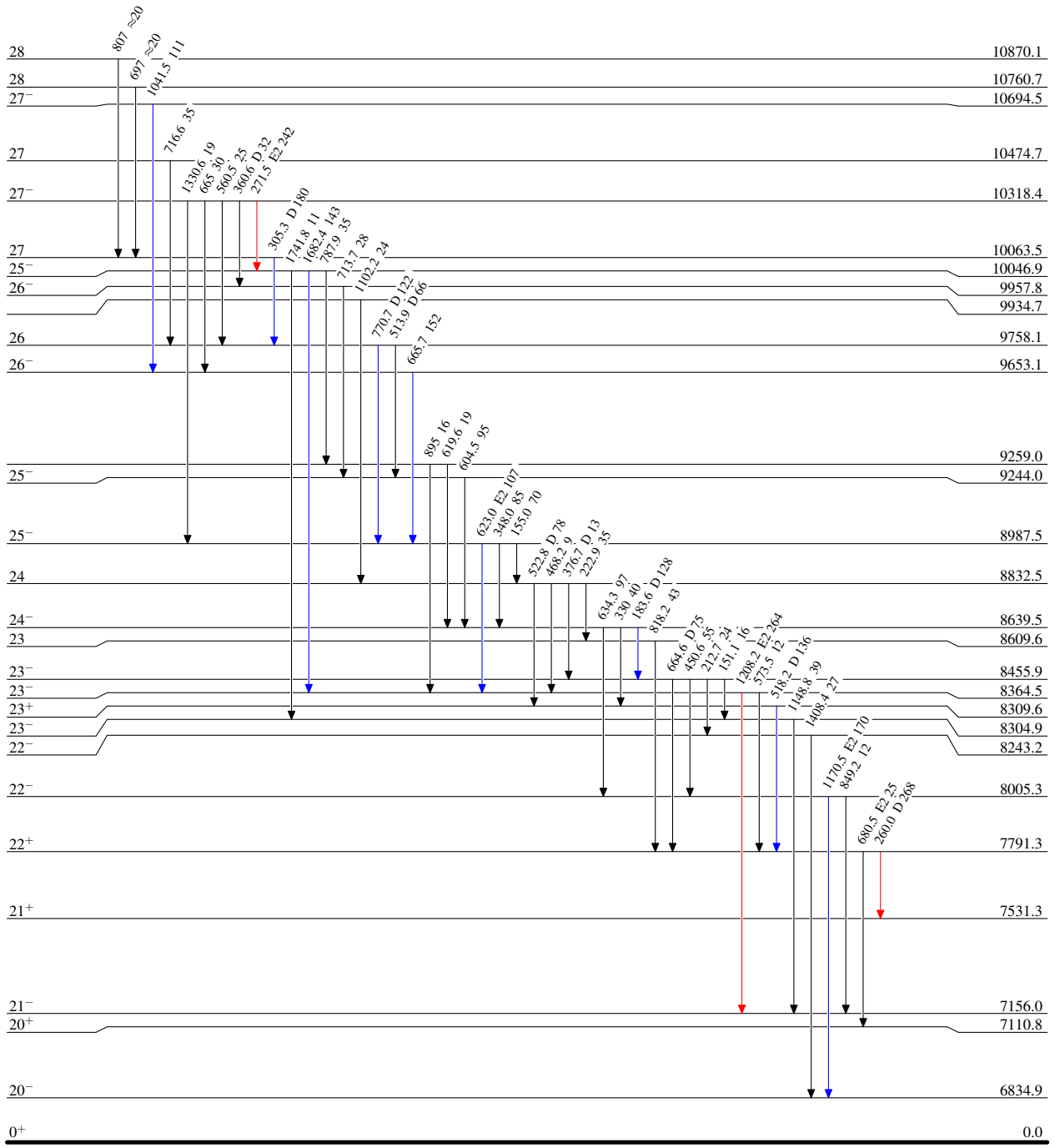
Intensities: Relative I_γ

Legend

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

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

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

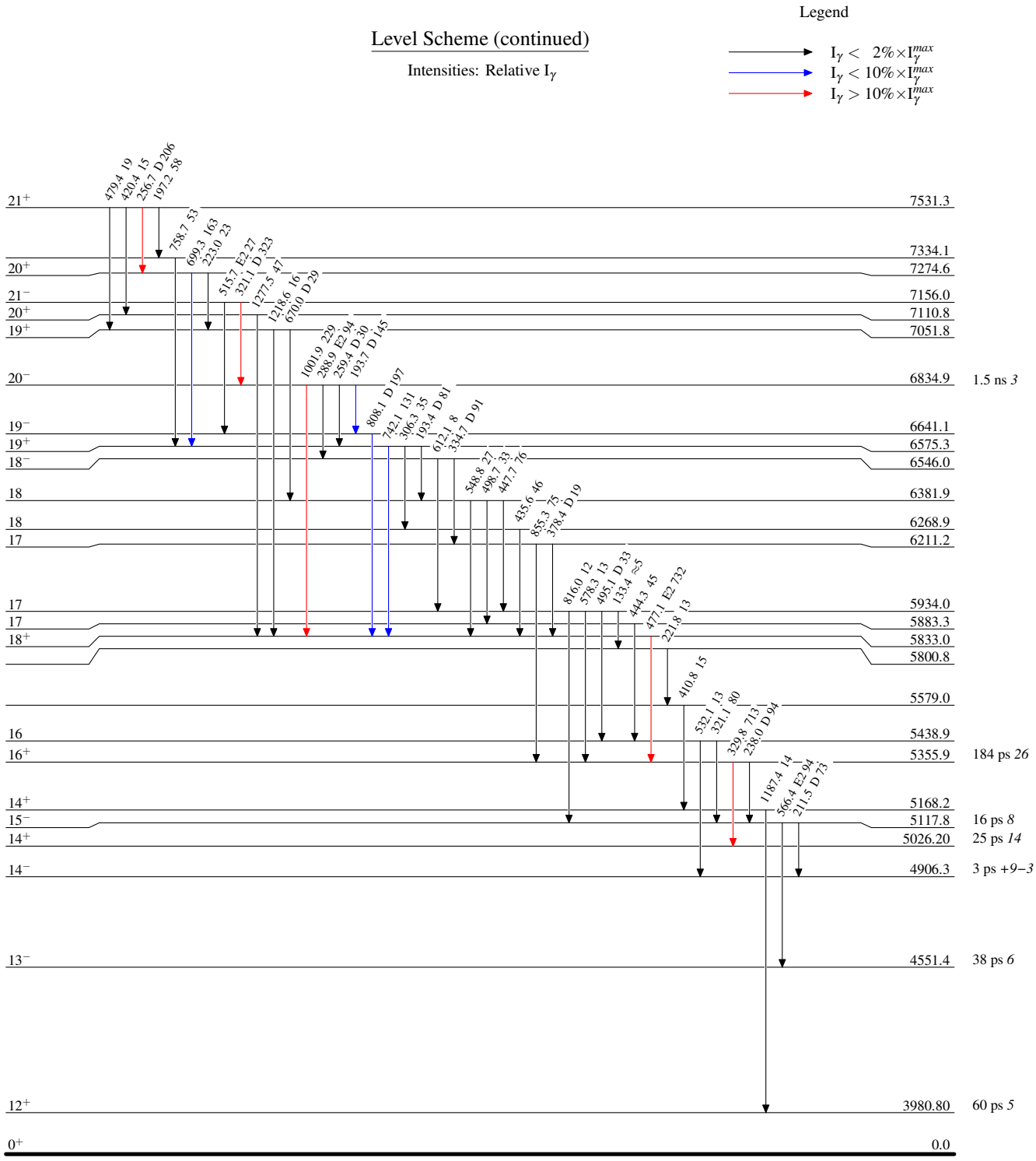


$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17

Level Scheme (continued)

Intensities: Relative I_γ

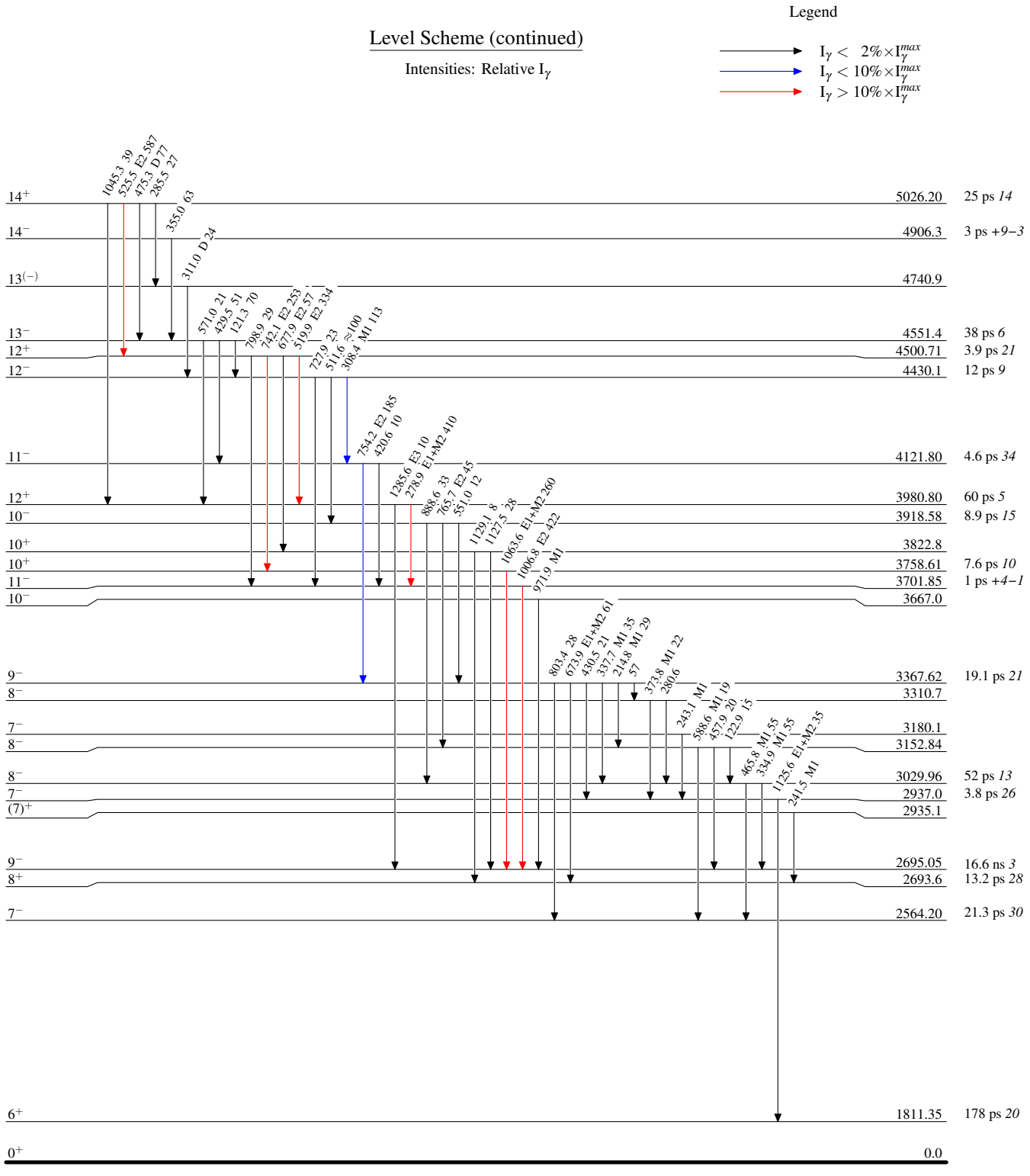


$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17

Level Scheme (continued)

Intensities: Relative I_γ

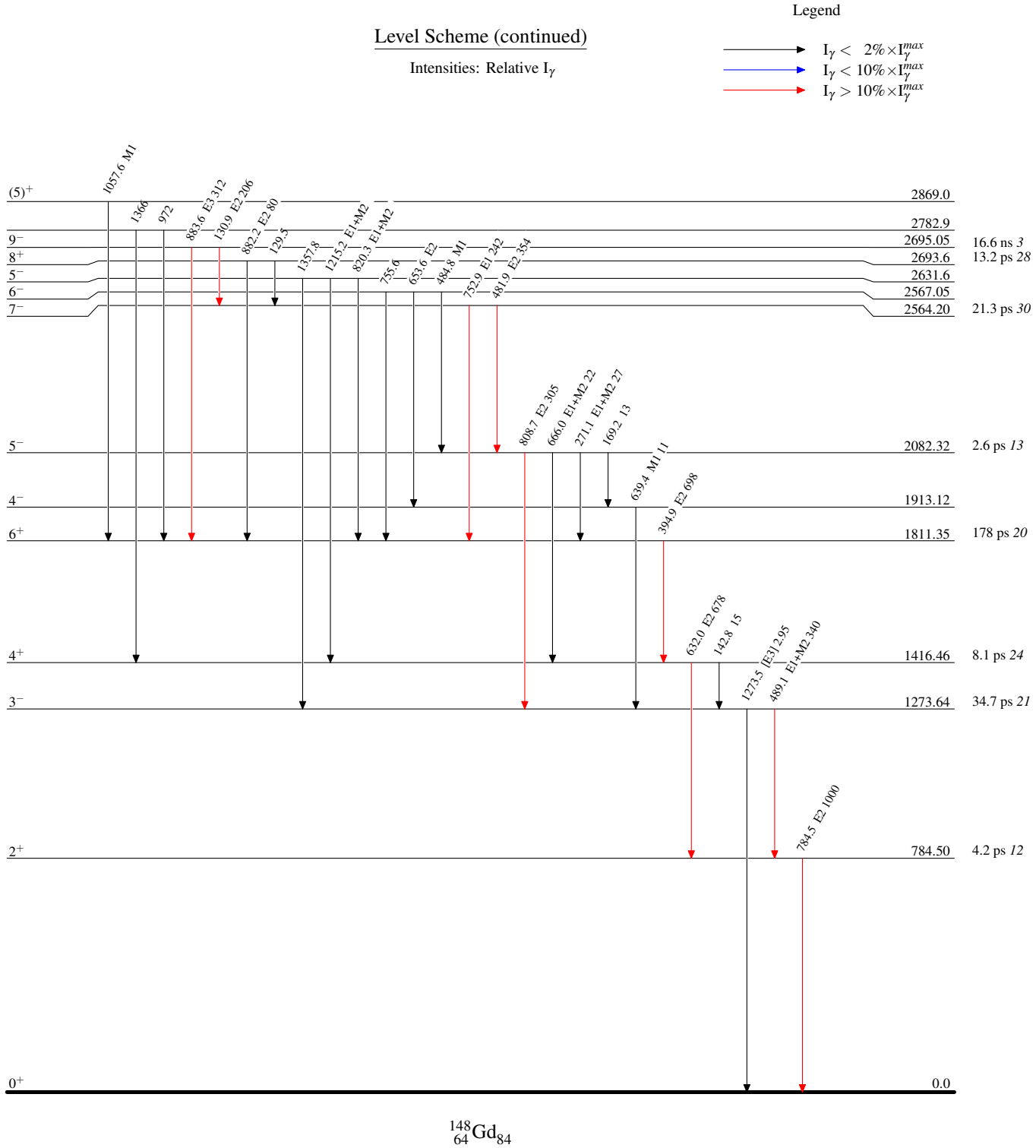


$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17

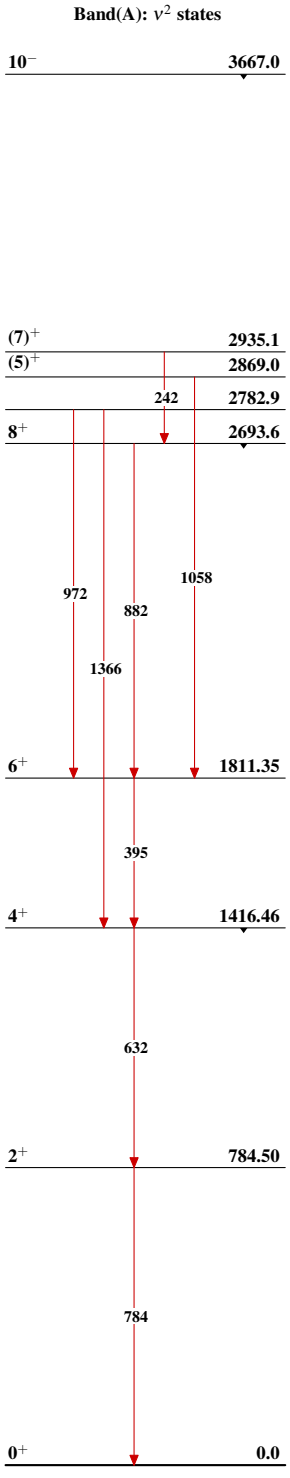
Level Scheme (continued)

Intensities: Relative I_γ



$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17



$^{148}_{64}Gd_{84}$

(HI,xnγ) 1990Dr06,1990Pi17 (continued)