^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 132, 1 (2016)	4-Dec-2015

Results given here are from measurements of primary γ's from average-resonance capture for 2-keV n (1993Ko01 and 1986GrZR).
Experimental methods:
1970Bo29: (n,γ) reaction on natural Gd target with neutron spectrum shaped to average over many resonances. Only one γ assigned to levels in ^{157}Gd.
1977GrZL: (n,γ) reaction with 2-keV n. Abstract, see 1986GrZR.
1986GrZR: (n,γ) reaction on enriched targets with 2-keV n beam, γ's measured with Ge detectors. Private communication to evaluator.
1993Ko01: (n,γ) reaction on enriched target with 2-keV beam. γ's measured with three-crystal pair spectrometer.

^{157}Gd Levels

E(level)†‡	J$^\pi$#@	Comments
0.0	$(1/2,3/2)^-$	
474.34 *15*	$(1/2,3/2)^+$	
683.38 *14*	$(1/2,3/2)^+$	
701.31 *14*	$(1/2,3/2)^-$	
729.05 *12*	$(1/2,3/2)^-$	
750.89 *23*	$(1/2,3/2)^+$	
762.49 *13*	$(1/2,3/2)^-$	
793.33 *14*	$(1/2,3/2)^-$	
808.84 *10*	$(1/2,3/2)^-$	
1040.95 *16*	$(1/2,3/2)^+$	
1092.24 *17*	$(1/2,3/2)^+$	
1249.6 *4*	$(1/2,3/2)^+$	
1283.0 *4*	$(1/2,3/2)^+$	
1298.25 *17*	$(1/2,3/2)^+$	
1315.67 *10*	$(1/2,3/2)^-$	
1330.67 *25*	$(1/2^+,3/2^+)$	
1339.10 *24*	$(1/2,3/2)^+$	
1348.87 *12*	$(1/2,3/2)^-$	
1386.51 *16*	$(1/2,3/2)^-$	
1412.71 *17*	$(1/2,3/2)^-$	
1477.90 *23*	$(5/2)^+$	J$^\pi$: Assigned $(5/2)^+$ by 1986GrZR and $(1/2,3/2)^-$ from multipolarity of primary γ (1993Ko01).
1489.71 *22*	$(1/2,3/2)^+$	
1521.60 *23*	(1/2,3/2)	
1525.6 *3*	$(1/2,3/2)^+$	
1552.0 *5*	$(1/2,3/2)^+$	
1562.7 *5*	$(1/2,3/2)^+$	
1564.7 *17*	$(1/2,3/2)^+$	
1568.5 *4*		
1583.7 *4*	$(1/2,3/2)^+$	
1589.69 *23*	(1/2,3/2)	J$^\pi$: Assigned π=+ by 1986GrZR and π=− from multipolarity of primary γ (1993Ko01).
1611.88 *18*	$(1/2,3/2)^-$	
1616.68 *20*	$(1/2,3/2)^-$	
1635.8 *4*	$(1/2,3/2)^+$	
1658.29 *19*	(1/2,3/2)	J$^\pi$: Assigned π=+ by 1986GrZR and π=− from multipolarity of primary γ (1993Ko01).
1666.60 *14*	$(1/2,3/2)^-$	
1678.9 *7*	$(1/2,3/2)^+$	
1692.2 *4*		
1701.7 *5*		
1717.66 *15*	(1/2,3/2)	
1720.70 *16*	(1/2,3/2)	

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^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR (continued)

^{157}Gd Levels (continued)

E(level)[†‡]	J$^{\pi}$[#@]	Comments
1736.4 *3*	(1/2,3/2)$^-$	
1740.3 *4*	(1/2,3/2)$^-$	
1750.14 *15*	(1/2,3/2)$^-$	
1760.09 *23*	(1/2,3/2)$^+$	
1788.2 *5*	(1/2,3/2)$^+$	
1802.0 *3*		
1824.04 *19*	(1/2,3/2)$^-$	
1836.2 *3*	(1/2,3/2)$^-$	
1845.4 *4*	(1/2,3/2)$^-$	
1850.7 *4*	(1/2,3/2)$^+$	
1854.9 *5*	(1/2,3/2)$^+$	
1861.72 *18*	(1/2,3/2)$^-$	
1889.26 *18*	(1/2,3/2)$^-$	
1896.36 *25*	(1/2,3/2)$^+$	
1906.1 *4*		
1915.88 *14*	(1/2,3/2)$^-$	
1920.91 *25*	(1/2,3/2)	
1937.18 *20*	(1/2,3/2)$^-$	
1953.0 *5*	(1/2,3/2)$^+$	
1956.90 *15*	(1/2,3/2)$^-$	
1963.3 *8*		
1976.1 *4*	(1/2,3/2)	
1983.6 *4*	(1/2,3/2)$^-$	
1992.01 *23*	(1/2,3/2)$^-$	
1997.3 *5*	(1/2,3/2)$^+$	E(level): Reported as 2000 keV by 1971Gr42.
2015.8 *7*		
2038.04 *25*	(1/2,3/2)$^-$	
2044.4 *5*		
2052.2 *3*		
2072.0 *3*	(1/2,3/2)	
2094.2 *3*	(1/2,3/2)$^+$	
2099.3 *3*		
2118.1 *4*	(1/2,3/2)$^-$	
2123.3 *7*		
2129.6 *3*		
2135.9 *4*		
2146.7 *3*	(1/2,3/2)$^-$	
2164.81 *16*	(1/2,3/2)$^-$	
2173.6 *3*	(1/2,3/2)$^-$	
2180.0 *8*		
2181.2 *3*		
2188.56 *20*	(1/2,3/2)$^-$	
2198.80 *21*	(1/2,3/2)$^-$	
2207.75 *21*	(1/2,3/2)$^-$	
2218.1 *3*	(1/2,3/2)$^-$	
2230.3 *3*	(1/2,3/2)$^-$	
2242.2 *6*		
2250.5 *5*		
2259.48 *25*	(1/2,3/2)$^-$	
2276.2 *8*		
2290.66 *25*	(1/2,3/2)$^-$	
2303.4 *7*		
2307.6 *7*		
2317.1 *3*	(1/2,3/2)$^-$	
2328.1 *4*		
2333.61 *25*	(1/2,3/2)$^-$	

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^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR (continued)

^{157}Gd Levels (continued)

E(level)[†‡]	J$^\pi$[#@]	Comments
2342.8 *4*		
2352.6 *4*		
2367.3 *3*	(1/2,3/2)$^-$	
2373.39 *19*	(1/2,3/2)$^-$	
2380.8 *4*	(1/2,3/2)$^-$	
2387.1 *5*		
2393.4 *7*		
2401.3 *4*		
2413.3 *5*	(1/2,3/2)$^+$	
2441.6 *4*	(1/2,3/2)$^-$	
2465.7 *7*		
2469.3 *6*	(1/2,3/2)$^-$	
2491.9 *3*	(1/2,3/2)$^+$	
2518.1 *8*		
2523.9 *5*		
2540.4 *8*		
2555.8 *4*		
2562.5 *4*		
2571.3 *4*		
2585.2 *3*	(1/2,3/2)$^-$	
2590.1 *5*	(1/2,3/2)$^-$	
2595.2 *6*		
2607.8 *3*	(1/2,3/2)$^-$	
2614.7 *4*	(1/2,3/2)$^-$	
2626.0 *5*		
2633.5 *4*	(1/2,3/2)$^-$	
2650.6 *6*		
2659.2 *5*	(1/2,3/2)$^+$	
2663.2 *11*		
2666.3 *5*	(1/2,3/2)$^+$	
6360.61 *7*	1/2$^+$	E(level): Capture state for n resonances with average energy of 2 keV. J$^\pi$: For s-wave capture; only ≈ 5% p-wave capture to 1/2$^-$ and 3/2$^-$ states is expected.

[†] The energy of the capture state was computed from the energy of the ground-state γ ray. With this value fixed, the energies of the remaining levels were computed from the primary γ energies.

[‡] Above 2100 keV, all levels are from 1993Ko01; below this they are from both 1986GrZR and 1993Ko01.

[#] Assigned by 1986GrZR from γ intensities from averaged n resonance capture and by evaluator from γ multipolarities of 1993Ko01. Below 1 MeV, more restricted assignments are generally available in the Adopted Levels.

[@] For band assignments, see ^{157}Gd Adopted Levels.

γ(^{157}Gd)

E$_\gamma$[†]	I$_\gamma$[†@]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]
3694.8 *5*	9.3 *22*	6360.61	1/2$^+$	2666.3	(1/2,3/2)$^+$	M1
3700.4 *7*	6.8 *22*	6360.61	1/2$^+$	2659.2	(1/2,3/2)$^+$	M1
3727.2 *5*	10.9 *26*	6360.61	1/2$^+$	2633.5	(1/2,3/2)$^-$	E1
3734.6 *5*	11.1 *25*	6360.61	1/2$^+$	2626.0		
3746.3 *5*	11.0 *23*	6360.61	1/2$^+$	2614.7	(1/2,3/2)$^-$	E1
3752.8 *4*	14.8 *25*	6360.61	1/2$^+$	2607.8	(1/2,3/2)$^-$	E1
3765.4 *6*	12 *3*	6360.61	1/2$^+$	2595.2		
3770.5 *5*	21 *4*	6360.61	1/2$^+$	2590.1	(1/2,3/2)$^-$	E1

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^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR (continued)

$\gamma(^{157}Gd)$ (continued)

E_γ[†]	I_γ[†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]
3775.4 *6*	12 *3*	6360.61	$1/2^+$	2585.2	$(1/2,3/2)^-$	E1
3789.3 *4*	13.0 *27*	6360.61	$1/2^+$	2571.3		
3798.1 *4*	12.9 *28*	6360.61	$1/2^+$	2562.5		
3804.8 *4*	16 *3*	6360.61	$1/2^+$	2555.8		
3820.2 *8*	9.1 *27*	6360.61	$1/2^+$	2540.4		
3836.7 *5*	13.5 *28*	6360.61	$1/2^+$	2523.9		
3842.4 *8*	9.4 *27*	6360.61	$1/2^+$	2518.1		
3868.8 *4*	11.6 *23*	6360.61	$1/2^+$	2491.9	$(1/2,3/2)^+$	M1
3891.7 *7*	8.6 *21*	6360.61	$1/2^+$	2469.3	$(1/2,3/2)^-$	E1
3918.8 *4*	15.1 *20*	6360.61	$1/2^+$	2441.6	$(1/2,3/2)^-$	E1
3947.0 *6*	6.2 *17*	6360.61	$1/2^+$	2413.3	$(1/2,3/2)^+$	M1
3967.2 *7*	5.4 *15*	6360.61	$1/2^+$	2393.4		
3973.5 *5*	5.6 *15*	6360.61	$1/2^+$	2387.1		
3979.4 *4*	8.3 *18*	6360.61	$1/2^+$	2380.8	$(1/2,3/2)^-$	E1
3987.14 *18*	21.8 *22*	6360.61	$1/2^+$	2373.39	$(1/2,3/2)^-$	E1
3993.2 *3*	11.7 *22*	6360.61	$1/2^+$	2367.3	$(1/2,3/2)^-$	E1
4008.0 *4*	10.7 *19*	6360.61	$1/2^+$	2352.6		
4017.8 *4*	8.6 *17*	6360.61	$1/2^+$	2342.8		
4026.88 *25*	16.5 *18*	6360.61	$1/2^+$	2333.61	$(1/2,3/2)^-$	E1
4043.1 *3*	11.7 *16*	6360.61	$1/2^+$	2317.1	$(1/2,3/2)^-$	E1
4053.0 *7*	8.6 *23*	6360.61	$1/2^+$	2307.6		
4057.2 *7*	9.2 *23*	6360.61	$1/2^+$	2303.4		
4069.9 *4*	14.3 *20*	6360.61	$1/2^+$	2290.66	$(1/2,3/2)^-$	E1
4084.4 *8*	4.3 *17*	6360.61	$1/2^+$	2276.2		
4101.2 *3*	17.3 *19*	6360.61	$1/2^+$	2259.48	$(1/2,3/2)^-$	E1
4118.4 *6*	5.9 *14*	6360.61	$1/2^+$	2242.2		
4130.28 *28*	14.4 *17*	6360.61	$1/2^+$	2230.3	$(1/2,3/2)^-$	E1
4142.3 *3*	23 *4*	6360.61	$1/2^+$	2218.1	$(1/2,3/2)^-$	E1
4153.31 *22*	20.9 *19*	6360.61	$1/2^+$	2207.75	$(1/2,3/2)^-$	E1
4161.67 *23*	19.8 *18*	6360.61	$1/2^+$	2198.80	$(1/2,3/2)^-$	E1
4171.92 *21*	22.7 *18*	6360.61	$1/2^+$	2188.56	$(1/2,3/2)^-$	E1
4179.33 *26*	18.8 *18*	6360.61	$1/2^+$	2181.2		
4187.11 *29*	15.0 *18*	6360.61	$1/2^+$	2173.6	$(1/2,3/2)^-$	E1
4195.71 *17*	26.4 *21*	6360.61	$1/2^+$	2164.81	$(1/2,3/2)^-$	E1
4214.0 *4*	13.1 *13*	6360.61	$1/2^+$	2146.7	$(1/2,3/2)^-$	E1
4224.7 *4*	10.5 *15*	6360.61	$1/2^+$	2135.9		
4231.0 *3*	11.7 *15*	6360.61	$1/2^+$	2129.6		
4242.5 *5*	10.5 *16*	6360.61	$1/2^+$	2118.1	$(1/2,3/2)^-$	E1
4261.0 *3*	10.0 *16*	6360.61	$1/2^+$	2099.3		
4266.8 *3*	10.0 *16*	6360.61	$1/2^+$	2094.2	$(1/2,3/2)^+$	M1
4288.38 *28*	11.8 *14*	6360.61	$1/2^+$	2072.0	(1/2,3/2)	E1,M1
4308.4 *3*	9.8 *14*	6360.61	$1/2^+$	2052.2		
4316.2 *5*	5.7 *14*	6360.61	$1/2^+$	2044.4		
4322.6 *3*	10.7 *15*	6360.61	$1/2^+$	2038.04	$(1/2,3/2)^-$	E1
4344.8 *7*	7 *3*	6360.61	$1/2^+$	2015.8		
4364.3 *7*	6.8 *18*	6360.61	$1/2^+$	1997.3	$(1/2,3/2)^+$	M1
4368.4 *3*	16.8 *20*	6360.61	$1/2^+$	1992.01	$(1/2,3/2)^-$	E1
4377.0 *4*	7.1 *14*	6360.61	$1/2^+$	1983.6	$(1/2,3/2)^-$	E1
4383.5 *9*	2.9 *13*	6360.61	$1/2^+$	1976.1	(1/2,3/2)	M1,E1
4397.3 *8*	3.5 *13*	6360.61	$1/2^+$	1963.3		
4403.8 *5*	9.6 *10*	6360.61	$1/2^+$	1956.90	$(1/2,3/2)^-$	E1
4408.1 *6*	7.1 *15*	6360.61	$1/2^+$	1953.0	$(1/2,3/2)^+$	M1
4423.0[#] *3*	8.4 *12*	6360.61	$1/2^+$	1937.18	$(1/2,3/2)^-$	E1
4440.6 *4*	8.2 *17*	6360.61	$1/2^+$	1920.91	(1/2,3/2)	E1,M1
4445.81 *22*	16.0 *16*	6360.61	$1/2^+$	1915.88	$(1/2,3/2)^-$	E1

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^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR (continued)

$\gamma(^{157}Gd)$ (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
4454.5 *4*	6.0 *13*	6360.61	1/2$^+$	1906.1			
4463.8 *3*	8.1 *12*	6360.61	1/2$^+$	1896.36	(1/2,3/2)$^+$	M1	
4471.10 *20*	15.3 *14*	6360.61	1/2$^+$	1889.26	(1/2,3/2)$^-$	E1	
4498.75 *20*	23.2 *26*	6360.61	1/2$^+$	1861.72	(1/2,3/2)$^-$	E1	
4505.5 *7*	7.5 *19*	6360.61	1/2$^+$	1854.9	(1/2,3/2)$^+$	M1	
4510.6 *10*	8.0 *22*	6360.61	1/2$^+$	1850.7	(1/2,3/2)$^+$	M1	
4514.9 *4*	15.7 *24*	6360.61	1/2$^+$	1845.4	(1/2,3/2)$^-$	E1	
4523.7 *4*	10.7 *18*	6360.61	1/2$^+$	1836.2	(1/2,3/2)$^-$	E1	
4536.55 *22*	20.5 *21*	6360.61	1/2$^+$	1824.04	(1/2,3/2)$^-$	E1	
4558.6 *3*	21.7 *24*	6360.61	1/2$^+$	1802.0			
4572.5 *5*	4.9 *12*	6360.61	1/2$^+$	1788.2	(1/2,3/2)$^+$	M1	
4600.6 *5*	5.2 *13*	6360.61	1/2$^+$	1760.09	(1/2,3/2)$^+$	M1	
4610.37 *14*	22.8 *14*	6360.61	1/2$^+$	1750.14	(1/2,3/2)$^-$	E1	
4620.3 *4*	15.3 *22*	6360.61	1/2$^+$	1740.3	(1/2,3/2)$^-$	E1,M1	
4624.1 *3*	16.6 *23*	6360.61	1/2$^+$	1736.4	(1/2,3/2)$^-$	E1	
4638.6 *5*	9.2 *16*	6360.61	1/2$^+$	1720.70	(1/2,3/2)	M1,E1	
4643.05 *15*	31.0 *19*	6360.61	1/2$^+$	1717.66	(1/2,3/2)	E1	
4660.7 *13*		6360.61	1/2$^+$	1701.7			
4667.8 *15*		6360.61	1/2$^+$	1692.2			
4683.3 *10*		6360.61	1/2$^+$	1678.9	(1/2,3/2)$^+$		
4693.82 *16*	26.0 *19*	6360.61	1/2$^+$	1666.60	(1/2,3/2)$^-$	E1	
4702.15 *19*	20.8 *25*	6360.61	1/2$^+$	1658.29	(1/2,3/2)	E1	
4723.9 *10*		6360.61	1/2$^+$	1635.8	(1/2,3/2)$^+$		
4743.91 *20*	24.0 *18*	6360.61	1/2$^+$	1616.68	(1/2,3/2)$^-$	E1	
4748.94 *19*	24.6 *19*	6360.61	1/2$^+$	1611.88	(1/2,3/2)$^-$	E1	I_γ: Uncertainty given (1993Ko01) as 0.7%, but assigned 7.7% by evaluator to be similar to other values.
4770.88 *23*	15.9 *15*	6360.61	1/2$^+$	1589.69	(1/2,3/2)	E1	
4777.0 *4*	9.9 *13*	6360.61	1/2$^+$	1583.7	(1/2,3/2)$^+$		
4791.8 *5*	7.1 *13*	6360.61	1/2$^+$	1568.5			
4795.8[#] *17*		6360.61	1/2$^+$	1564.7	(1/2,3/2)$^+$		
4797.7 *9*	3.8 *12*	6360.61	1/2$^+$	1562.7	(1/2,3/2)$^+$	M1	
4808.7 *6*	6.9 *15*	6360.61	1/2$^+$	1552.0	(1/2,3/2)$^+$	M1	
4835.0 *5*	8.2 *14*	6360.61	1/2$^+$	1525.6	(1/2,3/2)$^+$	M1	
4839.4 *3*	15.8 *15*	6360.61	1/2$^+$	1521.60	(1/2,3/2)	E1,M1	
4869.7 *7*	6.0 *17*	6360.61	1/2$^+$	1489.71	(1/2,3/2)$^+$	M1	
4882.8 *3*	12.2 *19*	6360.61	1/2$^+$	1477.90	(5/2)$^+$	E1	
4947.82 *20*	20.7 *16*	6360.61	1/2$^+$	1412.71	(1/2,3/2)$^-$	E1	
4973.87 *15*	22.6 *13*	6360.61	1/2$^+$	1386.51	(1/2,3/2)$^-$	E1	
5011.72 *13*	27.0 *15*	6360.61	1/2$^+$	1348.87	(1/2,3/2)$^-$	E1	
5021.26 *28*	10.1 *11*	6360.61	1/2$^+$	1339.10	(1/2,3/2)$^+$	M1	
5029.8 *3*	9.9 *11*	6360.61	1/2$^+$	1330.67	(1/2$^+$,3/2$^+$)	M1,E1	
5044.88 *9*	39.4 *17*	6360.61	1/2$^+$	1315.67	(1/2,3/2)$^-$	E1	
5061.8 *3*	7.9 *11*	6360.61	1/2$^+$	1298.25	(1/2,3/2)$^+$	M1	
5077.5 *4*	6.0 *11*	6360.61	1/2$^+$	1283.0	(1/2,3/2)$^+$	M1	
5110.6 *5*	6.1 *12*	6360.61	1/2$^+$	1249.6	(1/2,3/2)$^+$	M1	E_γ: Value given (1993Ko01) as 5100.59, but assigned by evaluator as 5110.59 to match proposed level energy.
5268.74 *24*	11.6 *13*	6360.61	1/2$^+$	1092.24	(1/2,3/2)$^+$	M1	
5319.50 *17*	21.5 *16*	6360.61	1/2$^+$	1040.95	(1/2,3/2)$^+$	E1,M1	
5551.60 *9*	85 *3*	6360.61	1/2$^+$	808.84	(1/2,3/2)$^-$	E1	
5567.16 *14*	43.3 *23*	6360.61	1/2$^+$	793.33	(1/2,3/2)$^-$	E1	
5598.01 *11*	57.8 *27*	6360.61	1/2$^+$	762.49	(1/2,3/2)$^-$	E1	
5609.9 *4*	12.7 *16*	6360.61	1/2$^+$	750.89	(1/2,3/2)$^+$	M1	
5631.45 *10*	66.9 *27*	6360.61	1/2$^+$	729.05	(1/2,3/2)$^-$	E1	

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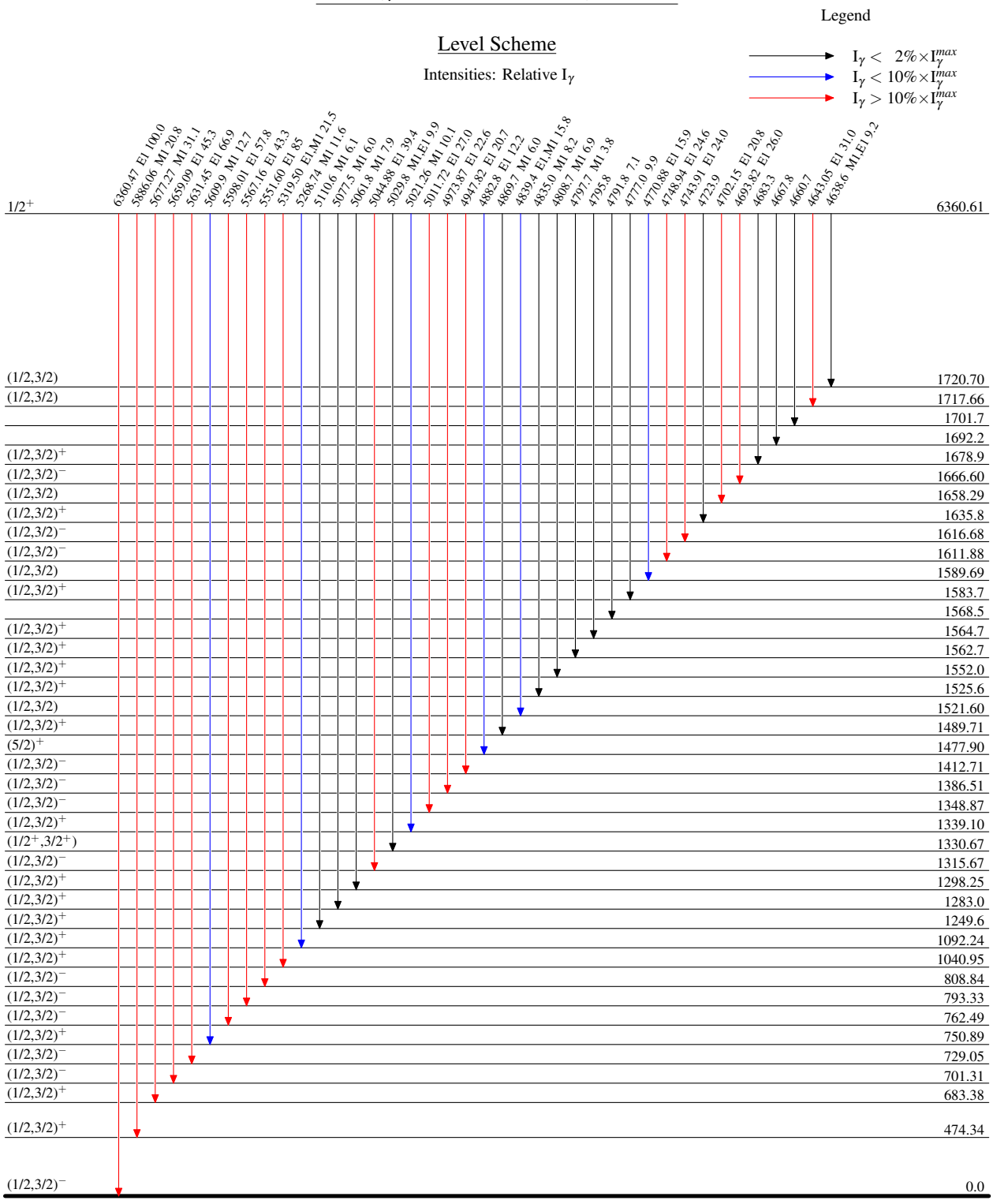
^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR (continued)

$\gamma(^{157}Gd)$ (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]
5659.09 *14*	45.3 *24*	6360.61	$1/2^+$	701.31	$(1/2,3/2)^-$	E1
5677.27 *19*	31.1 *22*	6360.61	$1/2^+$	683.38	$(1/2,3/2)^+$	M1
5886.06 *14*	20.8 *12*	6360.61	$1/2^+$	474.34	$(1/2,3/2)^+$	M1
6360.47 *7*	100.0 *29*	6360.61	$1/2^+$	0.0	$(1/2,3/2)^-$	E1

† From 1993Ko01 unless noted otherwise.
‡ From 1993Ko01 and assigned from comparison of the reduced γ intensities with the theoretical values from a Monte Carlo model and from the ratio of the γ intensities in the 2- and 24-keV measurements.
# From 1986GrZR.
@ Intensity per 100 neutron captures.

^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR



$^{157}_{64}Gd_{93}$

^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR

Level Scheme (continued)

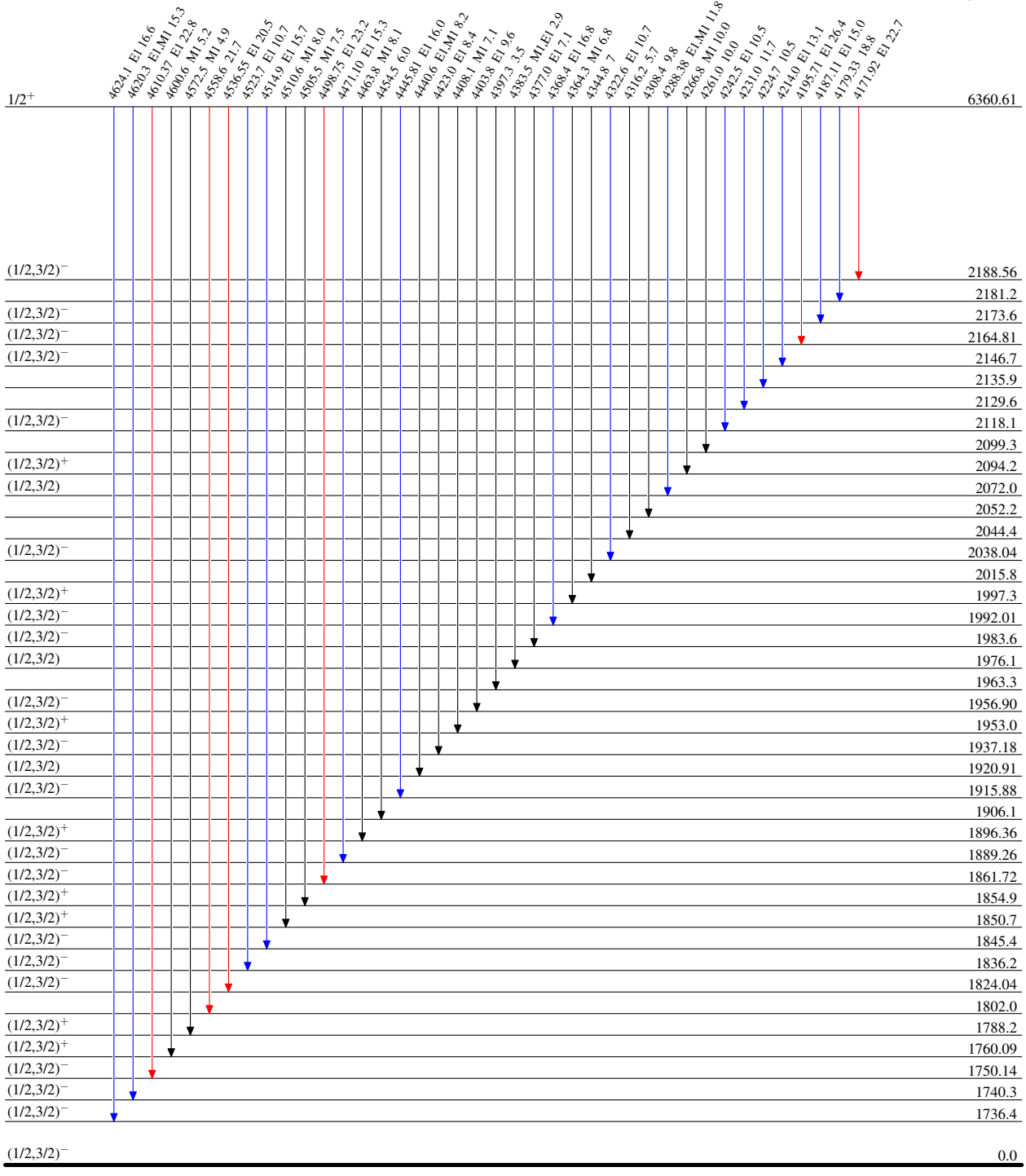
Intensities: Relative I_γ

Legend

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

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

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



$^{157}_{64}Gd_{93}$

^{156}Gd(n,γ) E=2 keV 1993Ko01,1986GrZR

Level Scheme (continued)

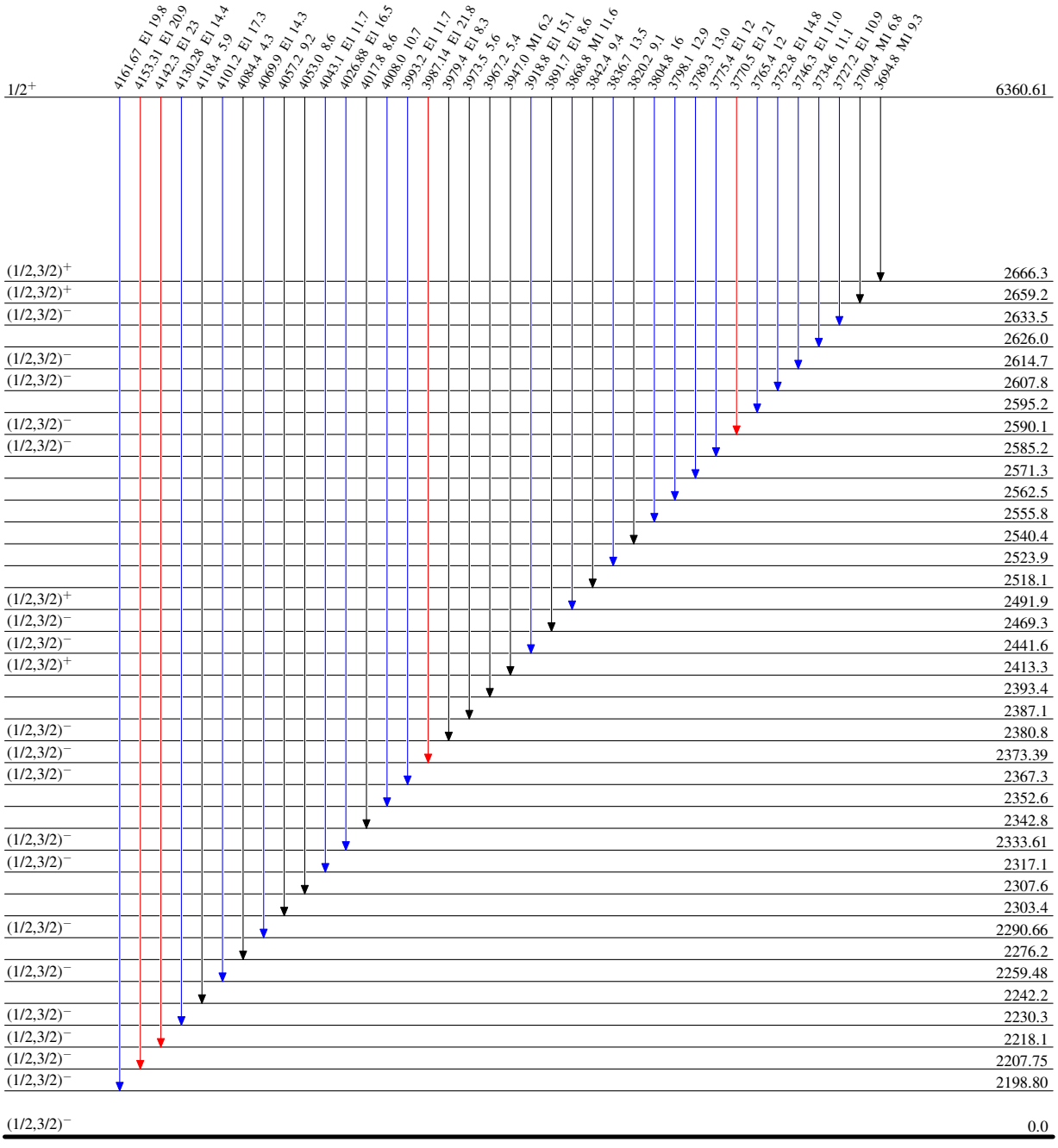
Intensities: Relative I_γ

Legend

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

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

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



$^{157}_{64}Gd_{93}$