^{157}Gd(γ,γ′) 1995Ma69

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

(γ,γ′) study with bremsstrahlung from 4.3-MeV electrons. Scattered photons measured in both 3-detector array giving angular distribution and in Compton polarimeter to give polarization.

Model calculations for M1 excitations are given by 1996De14, 1997PiZZ, and 2003Va01. The analysis of the data from odd-A nuclides to obtain the correct summed B(M1) values is discussed in 1997En05 for the general case and in 1998En01 specifically for ^{157}Gd.

^{157}Gd Levels

Approximate half-lives can be computed for all of the levels above 1800 keV from the reported $g\Gamma_{\gamma 0}$ or BM1↑ values, but since the J^{π}'s of these levels are not known, the actual values cannot be computed. If one assumes J=J(g.s.) these $T_{1/2}$ values range from 0.03 to 0.27 ps.

In comments: the integrated cross sections, I_s (in eV b), measured by 1995Ma69.

E(level)	J^{π}[†]	$g_J\Gamma_{\gamma 0}$(meV)	BM1↑[‡]	Comments
0.0	3/2$^-$			
54.5	5/2$^-$			
63.9	5/2$^+$			
115.7	7/2$^+$			
131.4	7/2$^-$			
1956		2.5 *4*	0.029 *4*	I_s=2.55 *39*.
1976		1.8 *4*	0.020 *4*	I_s=1.73 *36*.
2073		4.0 *4*	0.039 *4*	I_s=3.58 *41*.
2131		3.9 *4*	0.035 *4*	I_s=3.28 *37*.
2180		2.1 *4*	0.018 *3*	I_s=1.73 *32*.
2200		5.3 *5*	0.043 *4*	I_s=4.23 *38*.
2250		2.5 *7*	0.019 *5*	I_s=1.91 *50*.
2253		1.9 *5*	0.015 *3*	I_s=1.45 *35*.
2290		2.9 *4*	0.021 *3*	I_s=2.14 *33*.
2306		2.8 *4*	0.020 *4*	I_s=2.01 *29*.
2335		2.6 *4*	0.018 *3*	I_s=1.82 *30*.
2346		2.3 *5*	0.015 *3*	I_s=1.59 *36*.
2397		2.4 *4*	0.015 *3*	I_s=1.57 *28*.
2402		2.5 *4*	0.016 *3*	I_s=1.67 *28*.
2446		1.9 *4*	0.011 *3*	I_s=1.24 *28*.
2488		3.4 *5*	0.019 *3*	I_s=2.10 *30*.
2504		3.8 *5*	0.021 *3*	I_s=2.32 *28*.
2509		2.8 *5*	0.016 *3*	I_s=1.74 *31*.
2519		1.7 *5*	0.009 *3*	I_s=1.02 *29*.
2527		2.7 *6*	0.014 *3*	I_s=1.62 *26*.
2537		3.0 *5*	0.016 *3*	I_s=1.80 *30*.
2542		3.0 *6*	0.016 *3*	I_s=1.76 *35*.
2547		5.2 *6*	0.027 *3*	I_s=3.11 *32*.
2556		3.6 *5*	0.019 *3*	I_s=2.13 *29*.
2564		2.7 *5*	0.014 *3*	I_s=1.58 *31*.
2581		2.1 *6*	0.011 *3*	I_s=1.23 *33*.
2592		5.9 *5*	0.029 *3*	I_s=3.37 *30*.
2594		5.2 *5*	0.026 *2*	I_s=2.99 *28*.
2633		8.9 *7*	0.042 *3*	I_s=4.87 *38*.
2657		7.0 *6*	0.032 *3*	I_s=3.81 *33*.
2674		6.8 *10*	0.031 *5*	I_s=1.78 *25*.
2689		2.5 *5*	0.011 *2*	I_s=1.32 *28*.
2694		2.5 *5*	0.011 *2*	I_s=1.32 *29*.

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^{157}Gd(γ,γ') 1995Ma69 (continued)

^{157}Gd Levels (continued)

E(level)	$g_J\Gamma_{\gamma 0}$(meV)	BM1↑[‡]	Comments
2706	11.6 *12*	0.050 *5*	I_s=2.46 *29*.
2721	2.7 *5*	0.012 *2*	I_s=1.41 *24*.
2744	5.2 *6*	0.022 *2*	I_s=2.65 *28*.
2760	3.7 *6*	0.015 *2*	I_s=1.87 *30*.
2778	6.5 *10*	0.026 *4*	I_s=1.51 *25*.
2787	3.0 *6*	0.012 *2*	I_s=1.51 *29*.
2798	6.8 *6*	0.027 *2*	I_s=3.32 *31*.
2827	13.9 *14*	0.053 *5*	I_s=3.84 *33*.
2841	7.9 *7*	0.030 *3*	I_s=3.75 *33*.
2846	2.7 *7*	0.010 *3*	I_s=1.30 *33*.
2858	8.0 *7*	0.030 *3*	I_s=3.77 *33*.
2863	3.2 *5*	0.012 *2*	I_s=1.48 *23*.
2883	3.6 *5*	0.013 *2*	I_s=1.68 *24*.
2906	4.0 *5*	0.014 *2*	I_s=1.83 *24*.
2916	9.8 *12*	0.034 *4*	I_s=2.23 *25*.
2925	10.4 *12*	0.036 *4*	I_s=3.47 *31*.
3020	15.5 *15*	0.049 *5*	I_s=4.10 *36*.
3035	5.0 *6*	0.016 *2*	I_s=2.10 *26*.
3040	6.0 *6*	0.018 *2*	I_s=2.48 *27*.
3049	8.8 *18*	0.027 *6*	I_s=1.27 *26*.
3057	3.5 *6*	0.011 *2*	I_s=1.45 *26*.
3078	7.4 *12*	0.022 *3*	I_s=1.69 *24*.
3084	15.9 *15*	0.047 *5*	I_s=2.87 *30*.
3088	5.1 *6*	0.015 *2*	I_s=2.06 *26*.
3100	4.7 *6*	0.014 *2*	I_s=1.87 *24*.
3106	6.6 *10*	0.019 *3*	I_s=2.64 *38*.
3131	8.1 *8*	0.023 *2*	I_s=3.16 *30*.
3154	4.0 *6*	0.011 *2*	I_s=1.56 *24*.
3158	12.5 *15*	0.034 *4*	I_s=1.68 *29*.
3162	2.9 *7*	0.008 *2*	I_s=1.10 *28*.
3228	2.4 *5*	0.006 *1*	I_s=0.88 *20*.
3233	2.8 *7*	0.007 *2*	I_s=1.04 *24*.
3239	5.1 *6*	0.013 *2*	I_s=1.88 *22*.
3251	2.0 *5*	0.005 *1*	I_s=0.73 *18*.
3268	2.0 *6*	0.005 *1*	I_s=0.71 *21*.
3272	2.0 *6*	0.005 *1*	I_s=0.71 *20*.
3288	3.3 *5*	0.008 *1*	I_s=1.17 *19*.
3333	3.4 *6*	0.008 *2*	I_s=1.17 *23*.
3346	4.3 *6*	0.010 *1*	I_s=1.47 *22*.
3356	3.9 *8*	0.009 *2*	I_s=1.32 *27*.
3375	2.7 *6*	0.006 *1*	I_s=0.90 *21*.
3413	5.0 *8*	0.011 *2*	I_s=1.64 *28*.
3456	3.8 *8*	0.008 *2*	I_s=1.24 *26*.
3472	3.2 *7*	0.007 *1*	I_s=1.04 *23*.
3479	2.3 *8*	0.005 *2*	I_s=0.72 *24*.
3506	5.6 *8*	0.011 *2*	I_s=1.74 *26*.
3528	3.3 *7*	0.006 *1*	I_s=1.01 *23*.
3663	6.3 *12*	0.011 *2*	I_s=1.79 *35*.
3680	7.2 *14*	0.012 *2*	I_s=2.04 *40*.
3684	5.6 *11*	0.010 *2*	I_s=1.58 *32*.
3713	6.6 *12*	0.011 *2*	I_s=1.84 *33*.
3717	8.4 *12*	0.014 *2*	I_s=2.33 *35*.
3734	5.7 *16*	0.010 *3*	I_s=1.58 *45*.
3739	4.6 *11*	0.008 *2*	I_s=1.27 *31*.
3775	4.4 *14*	0.007 *2*	I_s=1.17 *39*.
3821	10.0 *28*	0.016 *4*	I_s=1.29 *34*.
3842	5.4 *22*	0.008 *3*	I_s=1.41 *55*.

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^{157}Gd(γ,γ') 1995Ma69 (continued)

^{157}Gd Levels (continued)

† From Adopted Levels.
‡ If transition is M1.

$\gamma(^{157}Gd)$

E_γ †	I_γ ‡	E_i(level)	E_f	J^π_f	E_γ †	I_γ ‡	E_i(level)	E_f	J^π_f
1956		1956	0.0	$3/2^-$	2863		2863	0.0	$3/2^-$
1976		1976	0.0	$3/2^-$	2871	35 *7*	2925	54.5	$5/2^-$
2073		2073	0.0	$3/2^-$	2883		2883	0.0	$3/2^-$
2131		2131	0.0	$3/2^-$	2906		2906	0.0	$3/2^-$
2180		2180	0.0	$3/2^-$	2916	100	2916	0.0	$3/2^-$
2200		2200	0.0	$3/2^-$	2925	100	2925	0.0	$3/2^-$
2250		2250	0.0	$3/2^-$	2934	184 *53*	3049	115.7	$7/2^+$
2253		2253	0.0	$3/2^-$	2947	79 *18*	3078	131.4	$7/2^-$
2290		2290	0.0	$3/2^-$	2966	60 *9*	3020	54.5	$5/2^-$
2306		2306	0.0	$3/2^-$	3020	100	3020	0.0	$3/2^-$
2335		2335	0.0	$3/2^-$	3030	124 *17*	3084	54.5	$5/2^-$
2346		2346	0.0	$3/2^-$	3035		3035	0.0	$3/2^-$
2397		2397	0.0	$3/2^-$	3040		3040	0.0	$3/2^-$
2402		2402	0.0	$3/2^-$	3049	100	3049	0.0	$3/2^-$
2446		2446	0.0	$3/2^-$	3057		3057	0.0	$3/2^-$
2488		2488	0.0	$3/2^-$	3078	100	3078	0.0	$3/2^-$
2504		2504	0.0	$3/2^-$	3084	100	3084	0.0	$3/2^-$
2509		2509	0.0	$3/2^-$	3088		3088	0.0	$3/2^-$
2519		2519	0.0	$3/2^-$	3094	187 *37*	3158	63.9	$5/2^+$
2527		2527	0.0	$3/2^-$	3100		3100	0.0	$3/2^-$
2537		2537	0.0	$3/2^-$	3106		3106	0.0	$3/2^-$
2542		2542	0.0	$3/2^-$	3131		3131	0.0	$3/2^-$
2547		2547	0.0	$3/2^-$	3154		3154	0.0	$3/2^-$
2556		2556	0.0	$3/2^-$	3158	100	3158	0.0	$3/2^-$
2564		2564	0.0	$3/2^-$	3162		3162	0.0	$3/2^-$
2575	146 *22*	2706	131.4	$7/2^-$	3228		3228	0.0	$3/2^-$
2581		2581	0.0	$3/2^-$	3233		3233	0.0	$3/2^-$
2592		2592	0.0	$3/2^-$	3239		3239	0.0	$3/2^-$
2594		2594	0.0	$3/2^-$	3251		3251	0.0	$3/2^-$
2620	104 *23*	2674	54.5	$5/2^-$	3268		3268	0.0	$3/2^-$
2633		2633	0.0	$3/2^-$	3272		3272	0.0	$3/2^-$
2657		2657	0.0	$3/2^-$	3288		3288	0.0	$3/2^-$
2663	116 *26*	2778	115.7	$7/2^+$	3333		3333	0.0	$3/2^-$
2674	100	2674	0.0	$3/2^-$	3346		3346	0.0	$3/2^-$
2689		2689	0.0	$3/2^-$	3356		3356	0.0	$3/2^-$
2694		2694	0.0	$3/2^-$	3375		3375	0.0	$3/2^-$
2706	100	2706	0.0	$3/2^-$	3413		3413	0.0	$3/2^-$
2721		2721	0.0	$3/2^-$	3456		3456	0.0	$3/2^-$
2744		2744	0.0	$3/2^-$	3472		3472	0.0	$3/2^-$
2760		2760	0.0	$3/2^-$	3479		3479	0.0	$3/2^-$
2763	75 *11*	2827	63.9	$5/2^+$	3506		3506	0.0	$3/2^-$
2778	100	2778	0.0	$3/2^-$	3528		3528	0.0	$3/2^-$
2785	98 *17*	2916	131.4	$7/2^-$	3663		3663	0.0	$3/2^-$
2787		2787	0.0	$3/2^-$	3680		3680	0.0	$3/2^-$
2798		2798	0.0	$3/2^-$	3684		3684	0.0	$3/2^-$
2827	100	2827	0.0	$3/2^-$	3713		3713	0.0	$3/2^-$
2841		2841	0.0	$3/2^-$	3717		3717	0.0	$3/2^-$
2846		2846	0.0	$3/2^-$	3734		3734	0.0	$3/2^-$
2858		2858	0.0	$3/2^-$	3739		3739	0.0	$3/2^-$

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^{157}Gd(γ,γ') 1995Ma69 (continued)

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

E_γ[†]	I_γ[‡]	E_i(level)	E_f	J^π_f
3767	104 *41*	3821	54.5	$5/2^-$
3775		3775	0.0	$3/2^-$
3821	100	3821	0.0	$3/2^-$
3842		3842	0.0	$3/2^-$

[†] From level energy difference.
[‡] Photon branching relative to γ ray to the ground state.

^{157}Gd(γ,γ′) 1995Ma69

Level Scheme

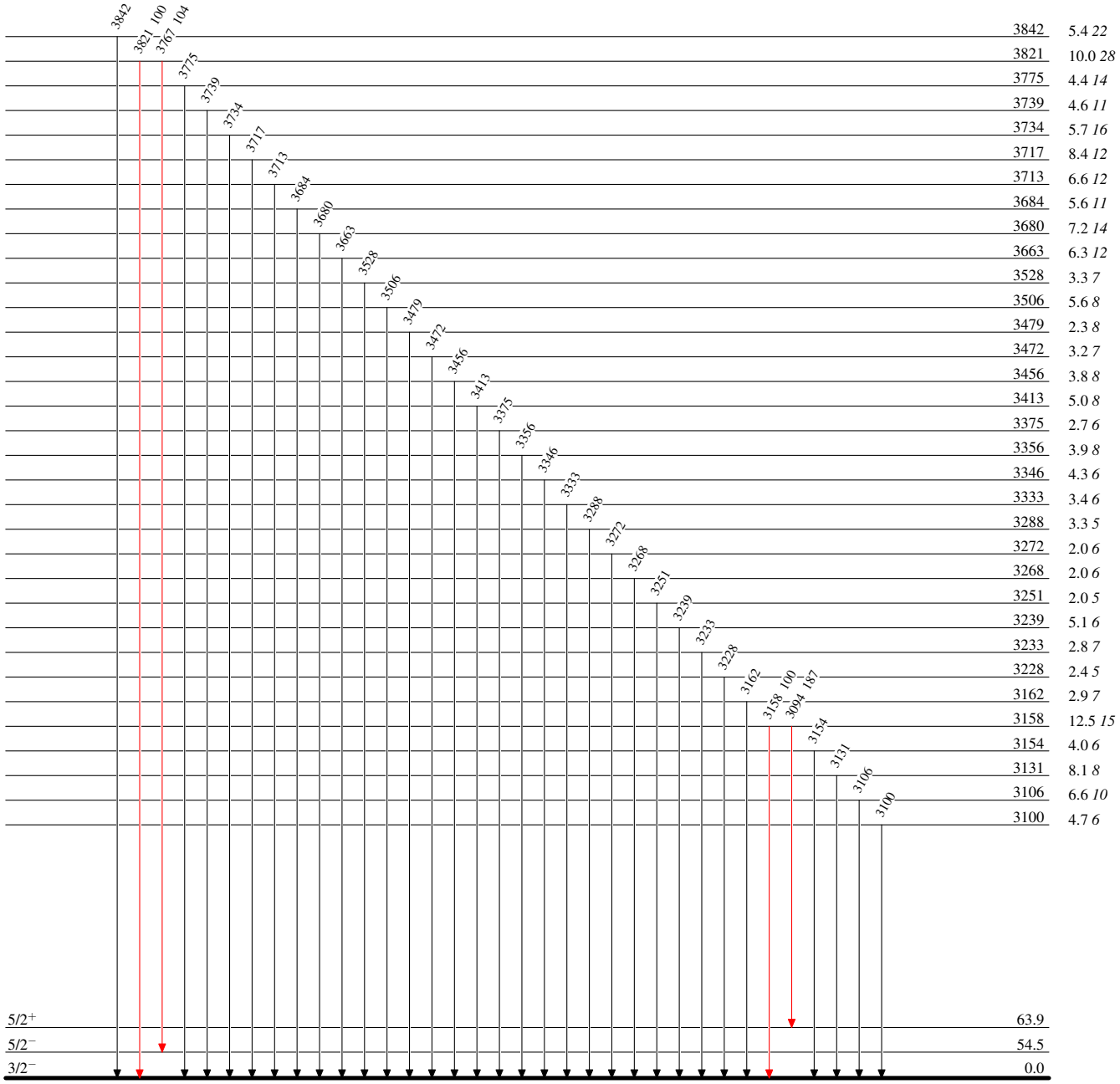
Intensities: Type not specified

Legend

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

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

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



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

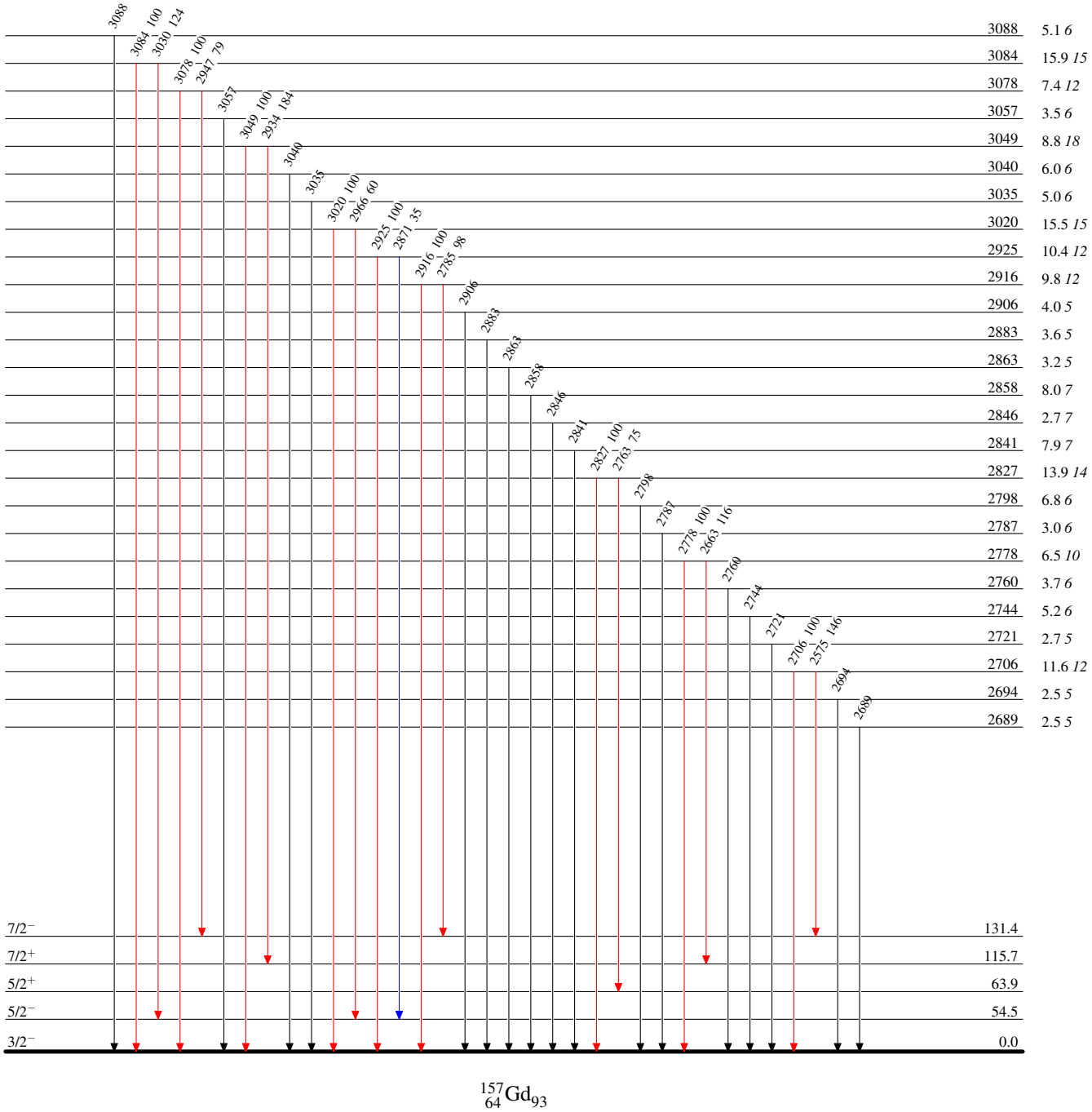
^{157}Gd(γ,γ′) 1995Ma69

Level Scheme (continued)

Intensities: Type not specified

Legend

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

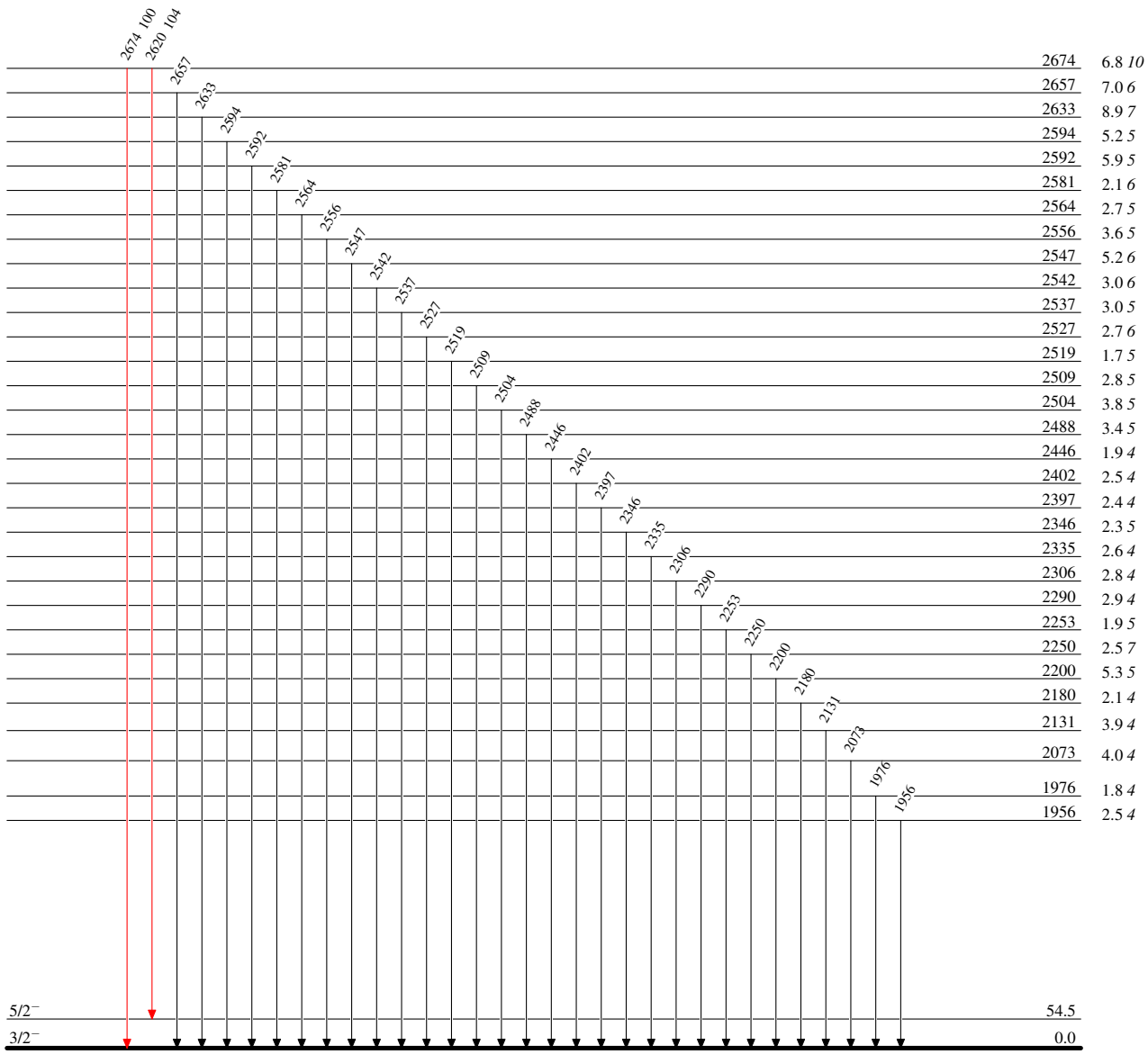


$^{157}_{64}Gd_{93}$

^{157}Gd(γ,γ′) 1995Ma69

Level Scheme (continued)

Intensities: Type not specified



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