^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

J^π(^{89}Y g.s.)=1/2$^-$.

2009Be03: E=9.5, 13.2 MeV electron beam provided by ELBE electron accelerator at Dresdan-Rosendorf facility. Measured Eγ, Iγ, γ(θ), scattering cross sections, width parameters using four HPGe detectors. About 250 levels reported up to 12 MeV excitation, somewhat above S(n)(^{89}Y)=11478 keV. See also 2011Be54 from the same group about analysis of dipole strength and cross sections.

1997Re13: E=7 MeV. Measured Eγ, Iγ using an EUROBALL array of seven encapsulated Ge detectors. Deduced 33 levels up to 6600 and associated transition strengths. Experiment used S-DALINAC accelerator in Darmstadt.

1993Hu05: E=2-5 MeV for excitation of ^{89}Y isomer and E=5 MeV for other states. Measured Eγ, Iγ. Deduced 14 levels up to 4170 and associated transition strengths and γ widths.

1976CaZD: E=6.6, 9.4 MeV. Measured Eγ, Iγ. Deduced levels and γ widths above an excitation energy of 4200. Also measured elastic scattering cross sections from E(γ)=4.8-10.1 MeV.

Additional information 1.

Others:

1996Ra29, 1996Ra30: (γ,γ) E=32.06, 33.29, 35.86, 39.96 keV. Measured coherent lengths.

1995La26: E=4 MeV. Measured isomer excitation.

1991Ca03: E=0.5-11 MeV. Measured isomer cross section.

1989An07: E<6 MeV. Measured cross section.

1973Fo15: E=100-800 MeV. Measured cross section for isomer excitation and $T_{1/2}$(isomer)=15.9 s *4*.

1972ArZD: measured G.

1970Ar08: E=12-30 MeV. Measured GDR at 16.4 MeV with Γ=3.5 MeV and another peak near 21.5 MeV.

1968Al13 (also 1970WiZY): E=0.8 MeV to 3.0 MeV. Measured γ, γ(θ).

All data are from 2009Be03, unless otherwise stated. Data above 6650 keV excitation are only from 2009Be03.

^{89}Y Levels

E(level)	J^π[†]	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]	Comments
0.0	1/2$^-$			
908.96	9/2$^+$	15.663 s		Isomer excitation investigated by 1993Hu05 and 1991Ca03. $T_{1/2}$=15.663 s *5*, from Adopted Levels.
1507.56 *10*	3/2$^-$	0.079 eV *8*	134 *14*	$T_{1/2}$=23.9 fs *+25−21* (1993Hu05). Other: 20.4 fs *13* (1972ArZD). $g\Gamma_0^2/\Gamma$=0.0381 eV *21* (from $T_{1/2}$ in 1993Hu05), 0.052 eV *17* (1968Al13). Γ_0=0.0191 eV *10* (1993Hu05), 0.0223 eV *14* (1972ArZD), 0.028 eV *8* (1968Al13). I_s (eVb): others: 98 *12* (1997Re13), 65 *4* (1993Hu05).
1744.8	5/2$^-$			E(level): from 1997Re13, not reported in 2009Be03.
2881.60 *10*	(3/2)$^-$	0.145 eV *15*	67 *7*	$T_{1/2}$=19.9 fs *+21−19* (1993Hu05). $g\Gamma_0^2/\Gamma$=0.0423 eV *26*. Γ_0=0.0220 eV *13* from $T_{1/2}$ and branching(2882γ)=96% in 1993Hu05. I_s (eVb): others: 31 *4* (1997Re13), 19.6 *12* (1993Hu05).
3067.8 *1*	3/2$^-$	0.105 eV *12*	43 *5*	$T_{1/2}$=45.0 fs *+15−11* (1993Hu05). $g\Gamma_0^2/\Gamma$=0.020 eV. Γ_0=0.0110 eV *23* from $T_{1/2}$ in 1993Hu05 and branching(3067γ)=91% from Adopted Gammas. I_s (eVb): other: 12 *2* (1997Re13), 8.2 *17* (1993Hu05).
3107.6 *3*	(5/2)$^-$	0.053 eV *7*	21 *3*	$T_{1/2}$=0.10 ps *+13−4* (1993Hu05). $g\Gamma_0^2/\Gamma$=0.010 eV *6*. Γ_0=0.0040 eV *22* from $T_{1/2}$ in 1993Hu05 and branching(3107γ)=83% from Adopted Gammas. Branching(3107)=87% (1993Hu05). I_s (eVb): other: 5.8 *9* (1997Re13), 4.0 *22* (1993Hu05).
3139.3 *4*	(5/2)$^-$	0.051 eV *8*	20 *3*	$T_{1/2}$=0.11 ps *+7−3* (1993Hu05). $g\Gamma_0^2/\Gamma$=0.0074 eV *28*. Γ_0=0.0032 eV *12* from $T_{1/2}$ in 1993Hu05 and branching(3139γ)=78% from 1993Hu05.

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	Jπ†	gΓ$_0^2$/Γ (eV)@	I$_s$ (eVb)&	Comments
				I$_s$ (eVb): others: 4.5 *8* (1997Re13), 2.9 *11* (1993Hu05).
3396.1‡ *3*		0.035‡ eV *6*	11.7‡ *19*	
3445.3‡ *3*		0.018‡ eV *3*	5.8‡ *9*	
3480.3‡ *5*		0.021‡ eV *8*	6.8‡ *24*	
3516.3 *3*	(3/2)$^-$	0.061 eV *8*	19 *2*	gΓ$_0^2$/Γ=0.008 eV *4*. I$_s$ (eVb): others: 2.5 *20* (1997Re13), 2.4 *11* (1993Hu05).
3660.0‡ *5*		0.023‡ eV *6*	6.7‡ *18*	
3898.6‡ *5*		0.024‡ eV *5*	6.1‡ *12*	
3992.2 *1*	3/2$^-$	0.145 eV *16*	35 *4*	gΓ$_0^2$/Γ=0.093 eV *10*. Γ$_0$=0.048 eV *6* from T$_{1/2}$ in 1993Hu05 for J=3/2 and branching=95% from Adopted Gammas. T$_{1/2}$=9.3 fs *+11−10* (1993Hu05) for J=3/2 and branching(3992γ)=95% (1993Hu05). T$_{1/2}$=12.6 fs *+16−13* for J=5/2. I$_s$ (eVb): others: 28 *4* (1997Re13), 22.4 *25* (1993Hu05).
4069.9‡ *8*		0.004‡ eV *3*	1.0‡ *6*	
4171.3 *1*	3/2$^-$,5/2$^-$	0.104 eV *13*	23 *3*	gΓ$_0^2$/Γ=0.115 eV *14*. Γ$_0$=0.038 eV *5* from T$_{1/2}$ in 1993Hu05 for J=5/2 and branching(4170γ)=100% from Adopted Gammas. T$_{1/2}$=10.1 fs *+15−11* (1993Hu05) for J=5/2. T$_{1/2}$=7.5 fs *+10−8* (for J=3/2). I$_s$ (eVb): others: 24 *3* (1997Re13), 26 *3* (1993Hu05).
4250#				Γ$_0$=0.10 eV *6* (1976CaZD).
4616.8 *5*		0.039 eV *12*	7 *2*	gΓ$_0^2$/Γ (eV): other: 0.022 eV *4* (1997Re13). I$_s$ (eVb): other: 4 *1* (1997Re13).
4625.8 *5*		0.011 eV *6*	2 *1*	
4992 *1*		0.039 eV *13*	6 *2*	gΓ$_0^2$/Γ (eV): other: 0.023 eV *8* (1997Re13). I$_s$ (eVb): other: 4 *1* (1997Re13).
5085.4 *6*		0.054 eV *13*	8 *2*	gΓ$_0^2$/Γ (eV): other: 0.037 eV *8* (1997Re13). I$_s$ (eVb): other: 5 *1* (1997Re13).
5152.1 *8*		0.032 eV *7*	5 *1*	E(level),gΓ$_0^2$/Γ (eV): from 1997Re13 only.
5167.7 *3*		0.21 eV *3*	30 *4*	gΓ$_0^2$/Γ (eV): other: 0.25 eV *3* (1997Re13). Γ$_0$=0.26 eV *9* (1976CaZD). I$_s$ (eVb): other: 36 *5* (1997Re13).
5419.4 *5*		0.130 eV *23*	17 *3*	gΓ$_0^2$/Γ (eV): other: 0.121 eV *19* (1997Re13). I$_s$ (eVb): other: 16 *2* (1997Re13).
5614.4 *15*		0.049 eV *16*	6 *2*	
5625.8 *2*		0.52 eV *6*	63 *7*	gΓ$_0^2$/Γ (eV): other: 0.57 eV *9* (1997Re13). Γ$_0$=1.0 eV *3* (1976CaZD). I$_s$ (eVb): other: 69 *11* (1997Re13).
5653.9 *15*		0.050 eV *25*	6 *3*	gΓ$_0^2$/Γ (eV): other: 0.066 eV *14* (1997Re13). I$_s$ (eVb): other: 8 *2* (1997Re13).
5789.4 *8*		0.087 eV *17*	10 *2*	
5796.4 *8*		0.096 eV *17*	11 *2*	E(level): 1997Re13 report a level at 5792.3 *5*, probably represents 5789$^+$ 5796 in 2009Be03. gΓ$_0^2$/Γ (eV): other: 0.13 eV *3* for a 5792 level (1997Re13). I$_s$ (eVb): other: 15 *3* (1997Re13) for a 5792 level in 2009Be03.
5910.7 *2*		0.67 eV *7*	74 *8*	gΓ$_0^2$/Γ (eV): other: 0.81 eV *13* (1997Re13); Γ$_0$=1.5 eV *5* (1976CaZD). I$_s$ (eVb): other: 88 *15* (1997Re13).
5923.4 *9*		0.073 eV *18*	8 *2*	gΓ$_0^2$/Γ (eV): other: 0.12 eV *3* (1997Re13). I$_s$ (eVb): other: 13 *3* (1997Re13).
6122.9 *2*		0.77 eV *5*	79 *9*	gΓ$_0^2$/Γ (eV): other: 0.79 eV *10* (1997Re13). Γ$_0$=1.0 eV *4* (1976CaZD). I$_s$ (eVb): other: 81 *14* (1997Re13).
6201.9 *8*		0.14 eV *5*	14 *5*	E(level),gΓ$_0^2$/Γ (eV): from 1997Re13 only.
6206.3 *3*		0.35 eV *5*	35 *5*	gΓ$_0^2$/Γ (eV): other: 0.23 eV *6* (1997Re13). I$_s$ (eVb): other: 23 *6* (1997Re13).
6275.6 *2*		4.2 eV *4*	409 *43*	gΓ$_0^2$/Γ (eV): other: 4.0 eV *7* (1997Re13). Γ$_0$=5.9 eV *12* (1976CaZD).

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]	Comments
			I_s (eVb): other: 395 *72* (1997Re13).
6297.6 *3*	0.72 eV *8*	70 *8*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.58 eV *11* (1997Re13). Γ_0=1.0 eV *4* (1976CaZD). I_s (eVb): other: 56 *11* (1997Re13).
6331.6 *2*	0.55 eV *6*	53 *6*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.49 eV *10* (1997Re13). Γ_0=0.6 eV *3* (1976CaZD). I_s (eVb): other: 47 *9* (1997Re13).
6359.1 *2*	0.63 eV *7*	60 *7*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.51 eV *10* (1997Re13). Γ_0=0.4 eV *2* (1976CaZD). I_s (eVb): other: 49 *10* (1997Re13).
6398.2 *2*	1.01 eV *11*	95 *10*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.77 eV *15* (1997Re13). Γ_0=1.0 eV *3* (1976CaZD). I_s (eVb): other: 73 *14* (1997Re13).
6441.5 *2*	1.04 eV *11*	95 *10*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.74 eV *15* (1997Re13). Γ_0=1.1 eV *4* (1976CaZD). I_s (eVb): other: 69 *14* (1997Re13).
6472.3 *18*	0.13 eV *4*	12 *4*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.063 eV *22* (1997Re13). I_s (eVb): other: 5.8 *20* (1997Re13).
6479 *3*	0.8 eV *3*	7 *3*	
6493.5 *8*	0.20 eV *4*	18 *4*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.071 eV *23* (1997Re13). I_s (eVb): other: 6.5 *21* (1997Re13).
6532.3 *3*	0.77 eV *9*	69 *8*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.51 eV *11* (1997Re13). I_s (eVb): other: 46 *10* (1997Re13).
6592.2 *3*	0.42 eV *6*	37 *5*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.23 eV *6* (1997Re13). I_s (eVb): other: 20 *5* (1997Re13).
6608.9 *5*	0.19 eV *3*	17 *3*	$g\Gamma_0^2/\Gamma$ (eV): other: 0.084 eV *26* (1997Re13). I_s (eVb): other: 7.4 *23* (1997Re13).
6651.6 *8*	0.14 eV *4*	12 *3*	
6666.8 *8*	0.14 eV *4*	12 *3*	
6728 *2*	0.059 eV *24*	5 *2*	
6751.1 *12*	0.095 eV *24*	8 *2*	
6772.0 *14*	0.107 eV *24*	9 *2*	
6782.9 *6*	0.25 eV *4*	21 *3*	
6798.2 *5*	0.42 eV *6*	35 *5*	
6852.4 *8*	0.21 eV *4*	17 *3*	
6866 *2*	0.061 eV *25*	5 *2*	
6921 *2*	0.050 eV *25*	4 *2*	
6934.7 *11*	0.138 eV *25*	11 *2*	
6944.5 *12*	0.125 eV *25*	10 *2*	
6959.6 *14*	0.101 eV *25*	8 *2*	
6987.4 *15*	0.089 eV *25*	7 *2*	
7003.8 *3*	0.73 eV *8*	57 *6*	
7066.8 *15*	0.13 eV *3*	10 *2*	
7077.7 *3*	0.85 eV *10*	65 *8*	
7106 *3*	0.066 eV *26*	5 *2*	
7118.2 *6*	0.30 eV *4*	23 *3*	
7147.1 *6*	0.33 eV *5*	25 *4*	
7178.6 *3*	0.79 eV *9*	59 *7*	
7198 *2*	0.08 eV *3*	6 *2*	
7225.3 *8*	0.31 eV *7*	23 *5*	
7240 *3*	0.10 eV *6*	7 *4*	
7255 *3*	0.06 eV *3*	4 *2*	
7304.4 *5*	0.44 eV *6*	32 *4*	
7325.4 *9*	0.21 eV *4*	15 *3*	
7383.7 *5*	0.47 eV *6*	33 *4*	
7420.4 *8*	0.42 eV *7*	29 *5*	
7452.1 *8*	0.33 eV *7*	23 *5*	
7475.2 *15*	0.26 eV *6*	18 *4*	
7484.1 *11*	0.36 eV *7*	25 *5*	
7527.9 *14*	0.30 eV *6*	20 *4*	
7536 *3*	0.15 eV *4*	10 *3*	

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^{89}Y(γ,γ') 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]
7548 *5*	0.07 eV *4*	5 *3*
7556 *4*	0.12 eV *5*	8 *3*
7566 *3*	0.10 eV *5*	7 *3*
7588.1 *18*	0.15 eV *5*	10 *3*
7618.4 *9*	0.23 eV *5*	15 *3*
7640.8 *11*	0.18 eV *5*	12 *3*
7652.3 *20*	0.11 eV *5*	7 *3*
7666.1 *6*	0.40 eV *8*	26 *5*
7692.2 *8*	0.34 eV *6*	22 *4*
7703.3 *15*	0.17 eV *5*	11 *3*
7714.0 *14*	0.28 eV *6*	18 *4*
7722.2 *9*	0.42 eV *8*	27 *5*
7750.5 *5*	0.78 eV *9*	50 *6*
7774.4 *5*	0.96 eV *11*	61 *7*
7787.5 *3*	1.59 eV *17*	101 *11*
7799.2 *8*	0.48 eV *6*	30 *4*
7811.8 *17*	0.19 eV *5*	12 *3*
7830.2 *6*	0.91 eV *11*	57 *7*
7838.7 *8*	0.58 eV *8*	36 *5*
7866.8 *17*	0.29 eV *11*	18 *7*
7902.5 *5*	0.81 eV *13*	50 *8*
7920.5 *3*	0.25 eV *8*	15 *5*
7922.7 *2*	0.31 eV *3*	19 *2*
7937.8 *9*	0.39 eV *8*	24 *5*
7961.7 *11*	0.53 eV *10*	32 *6*
7968.8 *9*	0.56 eV *10*	34 *6*
7986.0 *8*	0.68 eV *10*	41 *6*
7996.1 *5*	1.10 eV *15*	66 *9*
8018 *2*	0.18 eV *7*	11 *4*
8027.7 *8*	0.57 eV *8*	34 *5*
8067.3 *5*	0.54 eV *10*	32 *6*
8099.0 *14*	0.27 eV *7*	16 *4*
8129.3 *3*	1.19 eV *16*	69 *9*
8142.1 *12*	0.33 eV *9*	19 *5*
8150.8 *17*	0.40 eV *9*	23 *5*
8159.7 *9*	0.49 eV *9*	28 *5*
8175.6 *9*	0.33 eV *9*	19 *5*
8198.9 *5*	1.10 eV *14*	63 *8*
8210.9 *8*	0.53 eV *11*	30 *6*
8221.2 *3*	1.28 eV *18*	73 *10*
8270.7 *6*	0.34 eV *9*	19 *5*
8285.4 *17*	0.16 eV *7*	9 *4*
8311.0 *5*	0.81 eV *13*	45 *7*
8320.1 *6*	0.72 eV *11*	40 *6*
8330.4 *14*	0.25 eV *9*	14 *5*
8338.1 *8*	0.56 eV *11*	31 *6*
8369 *2*	0.31 eV *7*	17 *4*
8380.0 *9*	0.29 eV *7*	16 *4*
8403.1 *9*	0.35 eV *7*	19 *4*
8438.0 *8*	0.39 eV *9*	21 *5*
8455 *4*	0.28 eV *7*	15 *4*
8466.9 *8*	0.78 eV *13*	42 *7*
8483.2 *9*	0.58 eV *9*	31 *5*
8495.2 *8*	0.66 eV *11*	35 *6*
8513.5 *5*	0.74 eV *13*	39 *7*
8530.6 *8*	1.00 eV *15*	53 *8*
8548.3 *12*	0.52 eV *13*	28 *7*

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]	Comments
8556.0 *9*	0.34 eV *11*	18 *6*	
8568.0 *6*	0.69 eV *13*	36 *7*	
8586.9 *6*	0.69 eV *13*	36 *7*	
8603 *3*	0.19 eV *10*	10 *5*	
8610.8 *12*	0.64 eV *15*	33 *8*	
8642.1 *8*	0.39 eV *12*	20 *6*	
8668.0 *5*	3.3 eV *4*	168 *22*	Γ_0=7.4 eV *19* (1976CaZD).
8764.2 *3*	1.94 eV *26*	97 *13*	
8779.3 *11*	0.32 eV *10*	16 *5*	
8843.4 *5*	1.12 eV *24*	55 *12*	
8864 *4*	0.35 eV *14*	17 *7*	
8877.3 *5*	1.13 eV *25*	55 *12*	
8899.3 *6*	0.85 eV *19*	41 *9*	
8926.3 *14*	0.48 eV *10*	23 *5*	
8981 *3*	0.27 eV *11*	13 *5*	
8994.5 *17*	0.82 eV *17*	39 *8*	
9002.8 *15*	0.87 eV *19*	41 *9*	
9024.2 *9*	0.64 eV *13*	30 *6*	
9043.4 *6*	1.26 eV *17*	59 *8*	
9057.8 *15*	0.62 eV *13*	29 *6*	
9069.0 *11*	1.03 eV *15*	48 *7*	
9082 *2*	0.39 eV *11*	18 *5*	
9093.4 *8*	1.14 eV *19*	53 *9*	
9112.7 *19*	0.54 eV *13*	25 *6*	
9121.4 *8*	1.08 eV *24*	50 *11*	
9147.0 *9*	0.68 eV *13*	31 *6*	
9161.2 *14*	0.48 eV *11*	22 *5*	
9175.7 *9*	0.68 eV *11*	31 *5*	
9191.2 *8*	0.97 eV *13*	44 *6*	
9204.5 *5*	1.98 eV *22*	90 *10*	
9240.0 *6*	0.86 eV *12*	39 *6*	
9256.1 *6*	1.00 eV *16*	45 *7*	
9280.2 *15*	0.38 eV *9*	17 *4*	
9290.8 *15*	0.47 eV *9*	21 *4*	
9301.1 *12*	1.08 eV *18*	48 *8*	
9308.4 *14*	0.88 eV *16*	39 *7*	
9320 *2*	0.54 eV *18*	24 *8*	
9326.7 *11*	1.00 eV *20*	44 *9*	
9351.2 *8*	1.3 eV *3*	55 *12*	
9374.7 *8*	1.4 eV *4*	59 *16*	
9401.8 *18*	1.5 eV *4*	63 *16*	
9410.0 *17*	1.8 eV *4*	77 *17*	
9449.6 *9*	1.07 eV *16*	46 *7*	
9471 *3*	0.56 eV *16*	24 *7*	
9482.0 *15*	1.29 eV *23*	55 *10*	
9503 *3*	0.9 eV *4*	37 *15*	
9532 *4*	0.7 eV *3*	31 *14*	
9541 *3*	0.8 eV *3*	33 *12*	
9575.6 *18*	1.00 eV *22*	42 *9*	
9593.6 *15*	1.25 eV *26*	52 *11*	
9623.7 *11*	0.80 eV *17*	33 *7*	
9660.9 *8*	1.17 eV *17*	48 *7*	
9679.4 *2*	0.29 eV *12*	12 *5*	
9901.0 *8*	0.79 eV *13*	31 *5*	
9912.0 *8*	0.77 eV *13*	30 *5*	
9964.2 *9*	0.57 eV *10*	22 *4*	
9973.2 *6*	0.93 eV *13*	36 *5*	

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^{89}Y(γ,γ') 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]
9990.3 *12*	0.31 eV *8*	12 *3*
10005.8 *15*	0.23 eV *8*	9 *3*
10017.6 *18*	0.21 eV *8*	8 *3*
10037.4 *15*	0.58 eV *21*	22 *8*
10049 *2*	0.6 eV *3*	21 *11*
10065 *4*	0.5 eV *4*	19 *14*
10073.9 *19*	0.7 eV *5*	26 *20*
10091.3 *14*	0.7 eV *4*	25 *16*
10108.2 *14*	0.7 eV *4*	25 *15*
10141.3 *12*	1.07 eV *24*	40 *9*
10173.0 *11*	1.21 eV *22*	45 *8*
10194.5 *24*	0.54 eV *14*	20 *5*
10276.2 *19*	0.30 eV *14*	11 *5*
10286.9 *19*	0.50 eV *14*	18 *5*
10307.1 *11*	0.77 eV *14*	28 *5*
10324.5 *12*	0.64 eV *11*	23 *4*
10340.5 *15*	0.50 eV *11*	18 *4*
10379.3 *9*	0.39 eV *11*	14 *4*
10395.0 *12*	0.31 eV *8*	11 *3*
10412.7 *7*	1.10 eV *14*	39 *5*
10424.8 *9*	0.54 eV *9*	19 *3*
10460.9 *18*	0.80 eV *23*	28 *8*
10469 *6*	0.20 eV *14*	7 *5*
10504 *5*	0.26 eV *12*	9 *4*
10513.8 *15*	0.60 eV *17*	21 *6*
10538.1 *19*	0.38 eV *14*	13 *5*
10641.6 *11*	0.74 eV *15*	25 *5*
10659.7 *18*	0.74 eV *15*	25 *5*
10668.2 *11*	0.83 eV *18*	28 *6*
10697.4 *8*	1.04 eV *18*	35 *6*
10736.8 *14*	0.87 eV *24*	29 *8*
10744.5 *18*	0.75 eV *21*	25 *7*
10753 *3*	0.33 eV *15*	11 *5*
10967.5 *11*	0.78 eV *19*	25 *6*
11058.9 *15*	0.61 eV *13*	19 *4*
11069 *2*	0.41 eV *13*	13 *4*
11081.8 *9*	0.83 eV *16*	26 *5*
11106.9 *18*	0.39 eV *13*	12 *4*
11192.5 *19*	0.59 eV *23*	18 *7*
11200 *2*	0.46 eV *20*	14 *6*
11419.3 *14*	0.65 eV *14*	19 *4*
11463.0 *18*	0.62 eV *14*	18 *4*
11474 *3*	0.34 eV *14*	10 *4*
11498 *3*	0.24 eV *14*	7 *4*
11517 *2*	0.28 eV *17*	8 *5*
11535.9 *5*	0.21 eV *7*	6 *2*
11560.7 *6*	0.28 eV *10*	8 *3*
11571.2 *8*	0.21 eV *11*	6 *3*
11601.8 *17*	0.32 eV *14*	9 *4*
11611 *2*	0.25 eV *11*	7 *3*
11623 *3*	0.32 eV *14*	9 *4*
11646.0 *19*	0.25 eV *14*	7 *4*
11660.4 *14*	0.35 eV *25*	10 *7*
11669.3 *18*	0.25 eV *21*	7 *6*
11691.4 *18*	0.25 eV *18*	7 *5*
11739.8 *12*	0.47 eV *11*	13 *3*
11770.0 *12*	0.43 eV *11*	12 *3*

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

^{89}Y Levels (continued)

E(level)	$g\Gamma_0^2/\Gamma$ (eV)[@]	I_s (eVb)[&]	Comments
11802 *2*	0.33 eV *15*	9 *4*	
11817 *3*	0.18 eV *7*	5 *2*	
11832.1 *15*	0.36 eV *15*	10 *4*	
11843 *2*	0.22 eV *11*	6 *3*	
11854 *2*	0.29 eV *11*	8 *3*	
11873.5 *19*	0.18 eV *11*	5 *3*	
11913.2 *14*	0.30 eV *11*	8 *3*	
11946.9 *18*	0.15 eV *7*	4 *2*	
11962.3 *14*	0.19 eV *7*	5 *2*	
11984 *2*	0.11 eV *8*	3 *2*	
11991 *2*	0.15 eV *8*	4 *2*	
16.4×10^3			GDR (1970Ar08), Γ=3.95 MeV.
21.5×10^3 *2*			GDR (1970Ar08), Γ=4.0 MeV *3*.

† From Adopted Levels. Because most of the experimental angular distributions in 2009Be03 are uncertain for a definite assignment, no spin values are given in 2009Be03. From expected dipole (E1,M1) or quadrupole (E2) excitation, these are expected as 1/2,3/2,5/2$^-$, with 5/2$^-$ less likely for levels above 7 MeV due to predominance of dipole excitations from 1/2$^+$ state.

‡ From 1993Hu05. The cross sections are at E=5 MeV. This level is not included in Adopted Levels, since the associated γ transition could be from inelastic scattering.

From 1976CaZD only, not included in Adopted Levels.

@ Statistical factor g=(2J+1)/(2J_0+1), where J_0=spin of ^{89}Y g.s. Values are from 2009Be03, unless otherwise stated. Below 7 MeV excitation, values are also given by 1997Re13 and 1993Hu05. The Γ_0 values from 1976CaZD assume 100% γ branch to g.s. and g=1.

& Integrated scattering cross section from 2009Be03. Values from 1997Re13 at 7 MeV and from 1993Hu05 at 5 MeV are listed under comments.

γ(^{89}Y)

In γ(θ) measurement at 90° and 127°, expected ratio for a pure dipole transition in 1/2 –> 3/2 –> 1/2 sequence is 0.87 and for a pure quadrupole in 1/2 –> 5/2 –> 1/2 sequence, it is 1.15 (2009Be03).

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Mult.	Comments
908.96	9/2$^+$	908.96	0.0	1/2$^-$	M4+E5	E_γ,Mult.: from Adopted Gammas.
1507.56	3/2$^-$	1507.55 *10*	0.0	1/2$^-$		E_γ: from 1997Re13. Others: 1508.0 *2* (2009Be03), 1507.2 *1* in table 1 and 1507.6 in figure 2 of 1993Hu05. Iγ(150°)/Iγ(90°)=1.52 *12* gives δ=+0.69 *4*, +6 *1*, −0.15 *5* or −1.4 *2* (1968Al13). δ(E2/M1)=0.15 is consistent with B(E2)(e,e′) and $T_{1/2}$ (γγ′). Iγ(90°)/Iγ(127°)=0.99 *4*.
1744.8	5/2$^-$	1744.8	0.0	1/2$^-$		E_γ: from figure 2 (1997Re13); γ not reported in 2009Be03.
2881.60	(3/2)$^-$	2881.55 *10*	0.0	1/2$^-$		E_γ: weighted average of 2881.6 *2* (2009Be03), 2881.48 *10* (1997Re13), 2881.6 *1* (1993Hu05). Iγ(90°)/Iγ(127°)=0.91 *6*.
3067.8	3/2$^-$	3067.7 *1*	0.0	1/2$^-$		E_γ: weighted average of 3067.6 *2* (2009Be03) and 3067.7 *1* (1997Re13). Other: 3067.0 *3* in table 1 and 3067.2 in figure 2 of 1993Hu05. Iγ(90°)/Iγ(127°)=1.06 *9*.
3107.6	(5/2)$^-$	3107.5 *2*	0.0	1/2$^-$		E_γ: weighted average of 3107.6 *2* (2009Be03), 3107.4 *3* (1997Re13) and 3106.9 *6* (1993Hu05). Iγ(90°)/Iγ(127°)=1.20 *18*.

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

γ(^{89}Y) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Comments
3139.3	$(5/2)^-$	3139.2 *3*		0.0	$1/2^-$	E_γ: weighted average of 3139.4 *3* (2009Be03), 3139.0 *4* (1997Re13) and 3139.0 *5* (1993Hu05). Iγ(90°)/Iγ(127°)=1.2 *3*.
3396.1		3396.0[#] *3*		0.0	$1/2^-$	
3445.3		3445.2[#] *3*		0.0	$1/2^-$	
3480.3		3480.2[#] *5*		0.0	$1/2^-$	
3516.3	$(3/2)^-$	3516.2 *3*		0.0	$1/2^-$	E_γ: weighted average of 3516.5 *2* (2009Be03), 3515.8 *3* (1997Re13) and 3515.6 *6* (1993Hu05). Iγ(90°)/Iγ(127°)=1.06 *16*.
3660.0		3659.9[#] *5*		0.0	$1/2^-$	
3898.6		3898.5[#] *5*		0.0	$1/2^-$	
3992.2	$3/2^-$	3992.1 *1*		0.0	$1/2^-$	E_γ: weighted average of 3992.3 *2* (2009Be03), 3992.0 *1* (1997Re13). Other: 3991.8 *3* in table 1 and 3991.5 in figure 2 of 1993Hu05. Iγ(90°)/Iγ(127°)=0.81 *9*.
4069.9		4069.8[#] *8*		0.0	$1/2^-$	
4171.3	$3/2^-$,$5/2^-$	4171.2 *1*		0.0	$1/2^-$	E_γ: weighted average of 4171.6 *3* (2009Be03), 4171.2 *1* (1997Re13). Others: 4170.2 *4* (1993Hu05), 4172.0 (1997Re13). Iγ(90°)/Iγ(127°)=1.07 *13*.
4250		4250[&]		0.0	$1/2^-$	
4616.8		4616.7 *5*		0.0	$1/2^-$	E_γ: weighted average of 4616.7 *5* (1997Re13) and 4617.7 *15* (2009Be03). Iγ(90°)/Iγ(127°)=1.3 *5*.
4625.8		4625.7 *5*		0.0	$1/2^-$	Iγ(90°)/Iγ(127°)=1.0 *8*.
4992		4991 *1*		0.0	$1/2^-$	Iγ(90°)/Iγ(127°)=0.8 *4*. E_γ: weighted average of 4991 *1* (1997Re13) and 4993.3 *15* (2009Be03).
5085.4		5085.3 *6*		0.0	$1/2^-$	E_γ: other: 5083.5 *6* (1997Re13). Iγ(90°)/Iγ(127°)=0.9 *3*.
5152.1		5151.9 *8*		0.0	$1/2^-$	E_γ: γ not reported in 2009Be03.
5167.7		3660.6[@] *10*	4 *2*	1507.56	$3/2^-$	
		5167.5 *3*	96 *2*	0.0	$1/2^-$	E_γ: others: 5166.8 *2* (1997Re13), 5167 (1976CaZD). Iγ(90°)/Iγ(127°)=0.81 *8*.
5419.4		5419.2 *5*		0.0	$1/2^-$	E_γ: other: 5418.5 *2* (1997Re13). Iγ(90°)/Iγ(127°)=0.69 *14*.
5614.4		5614.2 *15*		0.0	$1/2^-$	Iγ(90°)/Iγ(127°)=1.0 *3*.
5625.8		4117.4[@] *5*	8 *2*	1507.56	$3/2^-$	
		5625.6 *2*	92 *2*	0.0	$1/2^-$	Γ_0=0.10 *6* (1976CaZD). E_γ: others: 5624.6 *2* (1997Re13), 5625 (1976CaZD). Iγ(90°)/Iγ(127°)=0.89 *6*.
5653.9		5653.7 *15*		0.0	$1/2^-$	E_γ: other: 5652.5 *5* (1997Re13). Iγ(90°)/Iγ(127°)=1.1 *6*.
5789.4		5789.2 *8*		0.0	$1/2^-$	Iγ(90°)/Iγ(127°)=0.74 *19*.
5796.4		5796.2 *8*		0.0	$1/2^-$	Iγ(90°)/Iγ(127°)=1.2 *3*. E_γ: 1997Re13 report 5792.5 *5*, probably represents 5789+5796 in 2009Be03.
5910.7		3028[@] *2*	4 *3*	2881.60	$(3/2)^-$	
		5910.5 *2*	96 *3*	0.0	$1/2^-$	E_γ: others: 5909.6 *2* (1997Re13), 5909 (1976CaZD). Iγ(90°)/Iγ(127°)=0.90 *6*.
5923.4		5923.2 *9*		0.0	$1/2^-$	E_γ: other: 5921.5 *6* (1997Re13). Iγ(90°)/Iγ(127°)=0.48 *22*.
6122.9		6122.7 *2*		0.0	$1/2^-$	E_γ: others: 6121.3 *2* (1997Re13), 6121 (1976CaZD). Iγ(90°)/Iγ(127°)=0.81 *7*.
6201.9		6201.7 *8*		0.0	$1/2^-$	E_γ: γ not reported in 2009Be03.

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

γ(^{89}Y) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Comments
6206.3		6206.1 *3*		0.0	1/2⁻	E_γ: other: 6206.6 *5* (1997Re13). Iγ(90°)/Iγ(127°)=1.08 *14*.
6275.6		6275.4 *2*		0.0	1/2⁻	E_γ: others: 6273.52 *6* (1997Re13), 6275 (1976CaZD). Iγ(90°)/Iγ(127°)=0.88 *4*.
6297.6		6297.4 *3*		0.0	1/2⁻	E_γ: others: 6295.9 *2* (1997Re13), 6296 (1976CaZD). Iγ(90°)/Iγ(127°)=0.93 *10*.
6331.6		6331.4 *2*		0.0	1/2⁻	E_γ: others: 6329.7 *2* (1997Re13), 6332 (1976CaZD). Iγ(90°)/Iγ(127°)=0.78 *8*.
6359.1		6358.9 *2*		0.0	1/2⁻	E_γ: others: 6357.6 *2* (1997Re13), 6359 (1976CaZD). Iγ(90°)/Iγ(127°)=1.03 *8*.
6398.2		6398.0 *2*		0.0	1/2⁻	E_γ: others: 6395.8 *2* (1997Re13), 6398 (1976CaZD). Iγ(90°)/Iγ(127°)=1.07 *7*.
6441.5		2925[@] *3*	9 *7*	3516.3	(3/2)⁻	
		6441.2 *2*	91 *7*	0.0	1/2⁻	E_γ: others: 6438.9 *2* (1997Re13), 6440 (1976CaZD). Iγ(90°)/Iγ(127°)=1.04 *6*.
6472.3		6472.0 *18*		0.0	1/2⁻	E_γ: other: 6472.5 *11* (1997Re13). Iγ(90°)/Iγ(127°)=1.2 *5*.
6479		6479 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.7 *3*.
6493.5		6493.2 *8*		0.0	1/2⁻	E_γ: other: 6490.8 *10* (1997Re13). Iγ(90°)/Iγ(127°)=1.3 *4*.
6532.3		6532.0 *3*		0.0	1/2⁻	E_γ: others: 6529.1 *3* (1997Re13), 6529 (1976CaZD). Iγ(90°)/Iγ(127°)=0.96 *7*.
6592.2		6591.9 *3*		0.0	1/2⁻	E_γ: other: 6588.6 *4* (1997Re13). Iγ(90°)/Iγ(127°)=0.94 *12*.
6608.9		6608.6 *5*		0.0	1/2⁻	E_γ: other: 6604.7 *8* (1997Re13). Iγ(90°)/Iγ(127°)=1.13 *22*.
6651.6		6651.3 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.3 *4*.
6666.8		6666.5 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *3*.
6728		6728 *2*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.2 *6*.
6751.1		6750.8 *12*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.4 *4*.
6772.0		6771.7 *14*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.9 *3*.
6782.9		6782.6 *6*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.86 *14*.
6798.2		6797.9 *5*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.88 *11*.
6852.4		6852.1 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *3*.
6866		6866 *2*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=2.8 *15*.
6921		6921 *2*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.4 *7*.
6934.7		6934.4 *11*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.93 *20*.
6944.5		6944.2 *12*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.91 *23*.
6959.6		6959.3 *14*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.41 *22*.
6987.4		6987.1 *15*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.6 *3*.
7003.8		7003.5 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.83 *7*.
7066.8		7066.5 *15*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *3*.
7077.7		7077.4 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.00 *9*.
7106		7106 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.8 *9*.
7118.2		7117.9 *6*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.84 *14*.
7147.1		7146.8 *6*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.76 *13*.
7178.6		7178.3 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.80 *7*.
7198		7198 *2*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *6*.
7225.3		7225.0 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.03 *25*.
7240		7240 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *8*.
7255		7255 *3*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.8 *7*.
7304.4		7304.1 *5*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.89 *12*.
7325.4		7325.1 *9*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.3 *3*.
7383.7		7383.4 *5*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.98 *12*.
7420.4		7420.1 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.90 *16*.
7452.1		7451.8 *8*		0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.94 *22*.

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^{89}Y(γ,γ') 2009Be03,1997Re13,1993Hu05 (continued)

$\gamma(^{89}Y)$ (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Comments
7475.2		7474.9 *15*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.94 *24*.
7484.1		7483.8 *11*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.90 *20*.
7527.9		7527.6 *14*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.54 *22*.
7536		7536 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.5 *4*.
7548		7548 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.23 *19*.
7556		7556 *4*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.1 *5*.
7566		7566 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.5 *3*.
7588.1		7587.8 *18*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.44 *25*.
7618.4		7618.1 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.1 *3*.
7640.8		7640.4 *11*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.0 *3*.
7652.3		7651.9 *20*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.6 *4*.
7666.1		7665.7 *6*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.97 *22*.
7692.2		7691.8 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.70 *17*.
7703.3		7702.9 *15*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.0 *4*.
7714.0		7713.6 *14*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.89 *25*.
7722.2		7721.8 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.75 *19*.
7750.5		7750.1 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.89 *10*.
7774.4		7774.0 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.90 *8*.
7787.5		7787.1 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.03 *7*.
7799.2		7798.8 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.83 *13*.
7811.8		7811.4 *17*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.0 *3*.
7830.2		7829.8 *6*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.88 *11*.
7838.7		7838.3 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.68 *13*.
7866.8		7866.4 *17*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.5 *3*.
7902.5		7902.1 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.89 *15*.
7920.5		7920.1 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.4 *13*.
7922.7		7922.3 *2*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=2.0 *11*.
7937.8		7937.4 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.1 *3*.
7961.7		7961.3 *11*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.8 *3*.
7968.8		7968.4 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.9 *3*.
7986.0		7985.6 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.63 *14*.
7996.1		7995.7 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.03 *17*.
8018		8018 *2*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.9 *5*.
8027.7		8027.3 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.97 *14*.
8067.3		8066.9 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.72 *9*.
8099.0		8098.6 *14*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.47 *25*.
8129.3		8128.9 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.89 *7*.
8142.1		8141.7 *12*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.10 *22*.
8150.8		8150.4 *17*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.0 *3*.
8159.7		8159.3 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.98 *20*.
8175.6		8175.2 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.86 *20*.
8198.9		8198.5 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.81 *8*.
8210.9		8210.5 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.93 *14*.
8221.2		8220.8 *3*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.91 *7*.
8270.7		8270.3 *6*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.3 *4*.
8285.4		8285.0 *17*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=2.4 *16*.
8311.0		8310.6 *5*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.93 *12*.
8320.1		8319.7 *6*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.02 *14*.
8330.4		8330.0 *14*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.68 *20*.
8338.1		8337.7 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.71 *12*.
8369		8369 *2*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.37 *21*.
8380.0		8379.6 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.7 *3*.
8403.1		8402.7 *9*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=1.1 *5*.
8438.0		8437.6 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.64 *14*.
8455		8455 *4*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.4 *4*.
8466.9		8466.5 *8*	0.0	1/2$^-$	Iγ(90°)/Iγ(127°)=0.84 *15*.

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

γ(^{89}Y) (continued)

E_i(level)	J_i^π	E_γ[†]	E_f	J_f^π	Comments
8483.2		8482.8 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.87 *20*.
8495.2		8494.8 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.65 *15*.
8513.5		8513.1 *5*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.67 *11*.
8530.6		8530.2 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.80 *24*.
8548.3		8547.9 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.79 *20*.
8556.0		8555.6 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.55 *15*.
8568.0		8567.6 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.67 *11*.
8586.9		8586.5 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.68 *13*.
8603		8603 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.0 *7*.
8610.8		8610.4 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.8 *4*.
8642.1		8641.6 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.7 *3*.
8668.0		8667.5 *5*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.00 *10*.
8764.2		8763.7 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.91 *7*.
8779.3		8778.8 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.98 *20*.
8843.4		8842.9 *5*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.63 *11*.
8864		8864 *4*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=2.0 *17*.
8877.3		8876.8 *5*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.96 *13*.
8899.3		8898.8 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.72 *12*.
8926.3		8925.8 *14*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.5 *3*.
8981		8981 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.4 *6*.
8994.5		8994.0 *17*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.84 *22*.
9002.8		9002.3 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.3 *3*.
9024.2		9023.7 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.0 *3*.
9043.4		9042.9 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.83 *14*.
9057.8		9057.3 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *3*.
9069.0		9068.5 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.73 *16*.
9082		9082 *2*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.8 *4*.
9093.4		9092.9 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.79 *18*.
9112.7		9112.2 *19*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.3 *3*.
9121.4		9120.9 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.75 *22*.
9147.0		9146.5 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.0 *3*.
9161.2		9160.7 *14*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.8 *3*.
9175.7		9175.2 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.78 *20*.
9191.2		9190.7 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.78 *14*.
9204.5		9204.0 *5*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.79 *9*.
9240.0		9239.5 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.95 *17*.
9256.1		9255.6 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.90 *17*.
9280.2		9279.7 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.9 *4*.
9290.8		9290.3 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.76 *15*.
9301.1		9300.6 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.31 *5*.
9308.4		9307.9 *14*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.5 *4*.
9320		9319 *2*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.5 *4*.
9326.7		9326.2 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.2 *3*.
9351.2		9350.7 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.66 *19*.
9374.7		9374.2 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.40 *18*.
9401.8		9401.3 *18*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *3*.
9410.0		9409.5 *17*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.3 *3*.
9449.6		9449.1 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.6 *3*.
9471		9470 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.2 *4*.
9482.0		9481.5 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.4 *4*.
9503		9502 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.3 *3*.
9532		9531 *4*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.5 *4*.
9541		9540 *3*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=2.0 *8*.
9575.6		9575.0 *18*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.6 *7*.
9593.6		9593.0 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.4 *5*.
9623.7		9623.1 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.90 *23*.

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

γ(^{89}Y) (continued)

E_i(level)	J_i^π	E_γ [†]	E_f	J_f^π	Comments
9660.9		9660.3 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.01 *16*.
9679.4		9678.8 *2*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.3 *6*.
9901.0		9900.4 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.04 *20*.
9912.0		9911.4 *8*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.03 *22*.
9964.2		9963.6 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.96 *20*.
9973.2		9972.6 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.62 *11*.
9990.3		9989.7 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.8 *3*.
10005.8		10005.2 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.6 *3*.
10017.6		10017.0 *18*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.7 *5*.
10037.4		10036.8 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.38 *20*.
10049		10048 *2*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.5 *3*.
10065		10064 *4*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.20 *15*.
10073.9		10073.3 *19*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.6 *6*.
10091.3		10090.7 *14*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.4 *3*.
10108.2		10107.6 *14*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.7 *4*.
10141.3		10140.7 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.68 *19*.
10173.0		10172.4 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.71 *18*.
10194.5		10193.9 *24*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.6 *4*.
10276.2		10275.6 *19*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.4 *4*.
10286.9		10286.3 *19*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.0 *3*.
10307.1		10306.5 *11*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.73 *20*.
10324.5		10323.9 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.46 *17*.
10340.5		10339.9 *15*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.24 *18*.
10379.3		10378.7 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.1 *4*.
10395.0		10394.3 *12*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.46 *17*.
10412.7		10412.0 *7*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.74 *14*.
10424.8		10424.1 *9*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.0 *3*.
10460.9		10460.2 *18*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=0.7 *3*.
10469		10468 *6*	0.0	1/2⁻	Iγ(90°)/Iγ(127°)=1.8 *15*.
10504		10503 *5*	0.0	1/2⁻	
10513.8		10513.1 *15*	0.0	1/2⁻	
10538.1		10537.4 *19*	0.0	1/2⁻	
10641.6		10640.9 *11*	0.0	1/2⁻	
10659.7		10659.0 *18*	0.0	1/2⁻	
10668.2		10667.5 *11*	0.0	1/2⁻	
10697.4		10696.7 *8*	0.0	1/2⁻	
10736.8		10736.1 *14*	0.0	1/2⁻	
10744.5		10743.8 *18*	0.0	1/2⁻	
10753		10752 *3*	0.0	1/2⁻	
10967.5		10966.8 *11*	0.0	1/2⁻	
11058.9		11058.2 *15*	0.0	1/2⁻	
11069		11068 *2*	0.0	1/2⁻	
11081.8		11081.1 *9*	0.0	1/2⁻	
11106.9		11106.2 *18*	0.0	1/2⁻	
11192.5		11191.7 *19*	0.0	1/2⁻	
11200		11199 *2*	0.0	1/2⁻	
11419.3		11418.5 *14*	0.0	1/2⁻	
11463.0		11462.2 *18*	0.0	1/2⁻	
11474		11473 *3*	0.0	1/2⁻	
11498		11497 *3*	0.0	1/2⁻	
11517		11516 *2*	0.0	1/2⁻	
11535.9		11535.1 *5*	0.0	1/2⁻	
11560.7		11559.9 *6*	0.0	1/2⁻	
11571.2		11570.4 *8*	0.0	1/2⁻	
11601.8		11601.0 *17*	0.0	1/2⁻	
11611		11610 *2*	0.0	1/2⁻	

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^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05 (continued)

γ(^{89}Y) (continued)

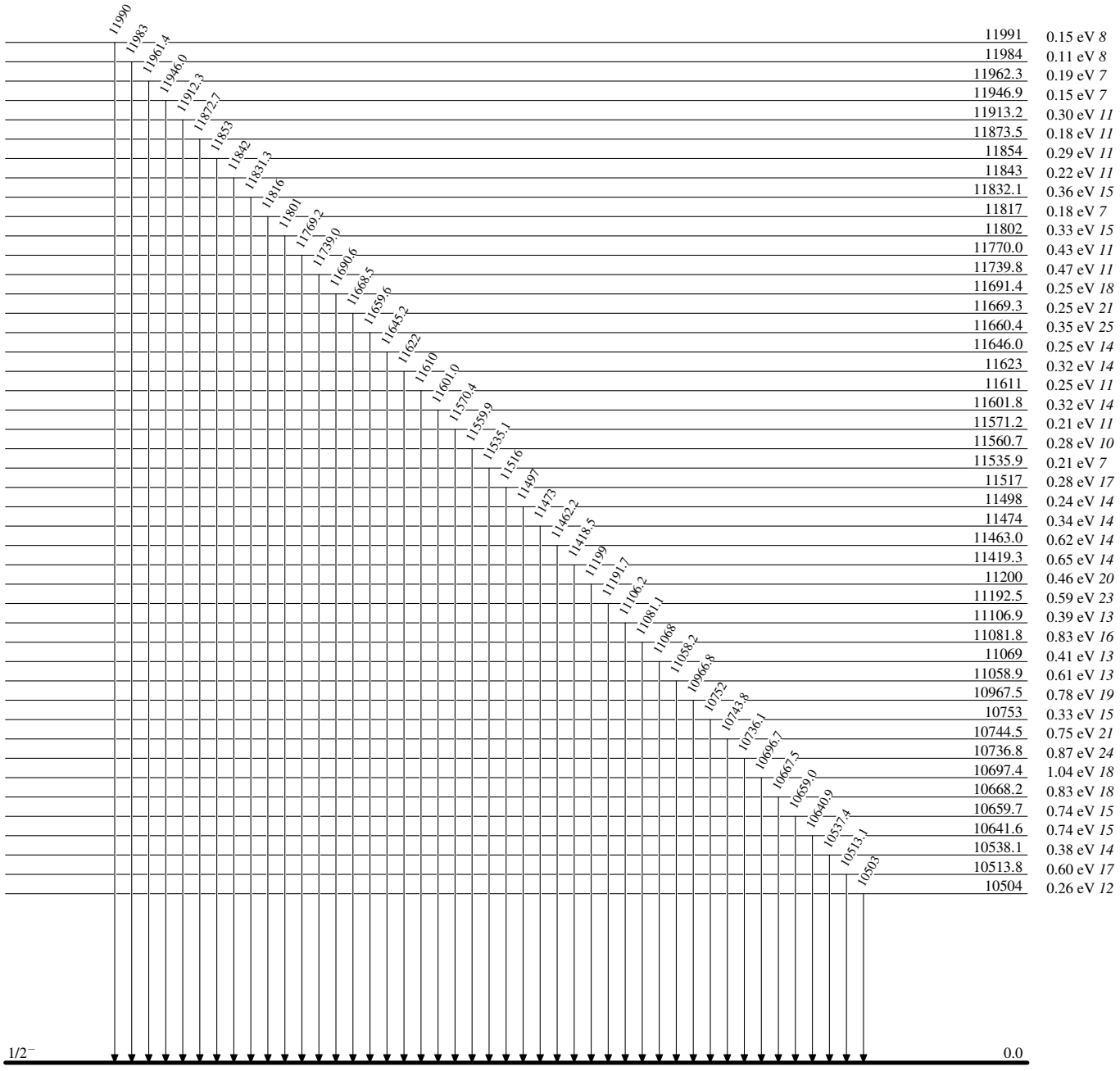
E_i(level)	J_i^π	E_γ †	E_f	J_f^π	E_i(level)	J_i^π	E_γ †	E_f	J_f^π	E_i(level)	J_i^π	E_γ †	E_f	J_f^π
11623		11622 *3*	0.0	1/2$^-$	11770.0		11769.2 *12*	0.0	1/2$^-$	11873.5		11872.7 *19*	0.0	1/2$^-$
11646.0		11645.2 *19*	0.0	1/2$^-$	11802		11801 *2*	0.0	1/2$^-$	11913.2		11912.3 *14*	0.0	1/2$^-$
11660.4		11659.6 *14*	0.0	1/2$^-$	11817		11816 *3*	0.0	1/2$^-$	11946.9		11946.0 *18*	0.0	1/2$^-$
11669.3		11668.5 *18*	0.0	1/2$^-$	11832.1		11831.3 *15*	0.0	1/2$^-$	11962.3		11961.4 *14*	0.0	1/2$^-$
11691.4		11690.6 *18*	0.0	1/2$^-$	11843		11842 *2*	0.0	1/2$^-$	11984		11983 *2*	0.0	1/2$^-$
11739.8		11739.0 *12*	0.0	1/2$^-$	11854		11853 *2*	0.0	1/2$^-$	11991		11990 *2*	0.0	1/2$^-$

† Main data are from 2009Be03. For levels below 5 MeV, weighted averages are taken of values from 2009Be03, 1997Re13 and 1993Hu05. Above 5 MeV, corresponding values in 1997Re13 are consistently higher than those in 2009Be03.
‡ Branching ratio from 1997Re13.
# From 1993Hu05 only, not included in Adopted Gammas.
@ From table 2 of 1997Re13.
& From 1976CaZD only, not included in Adopted Gammas.

^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05

Level Scheme

Intensities: % photon branching from each level

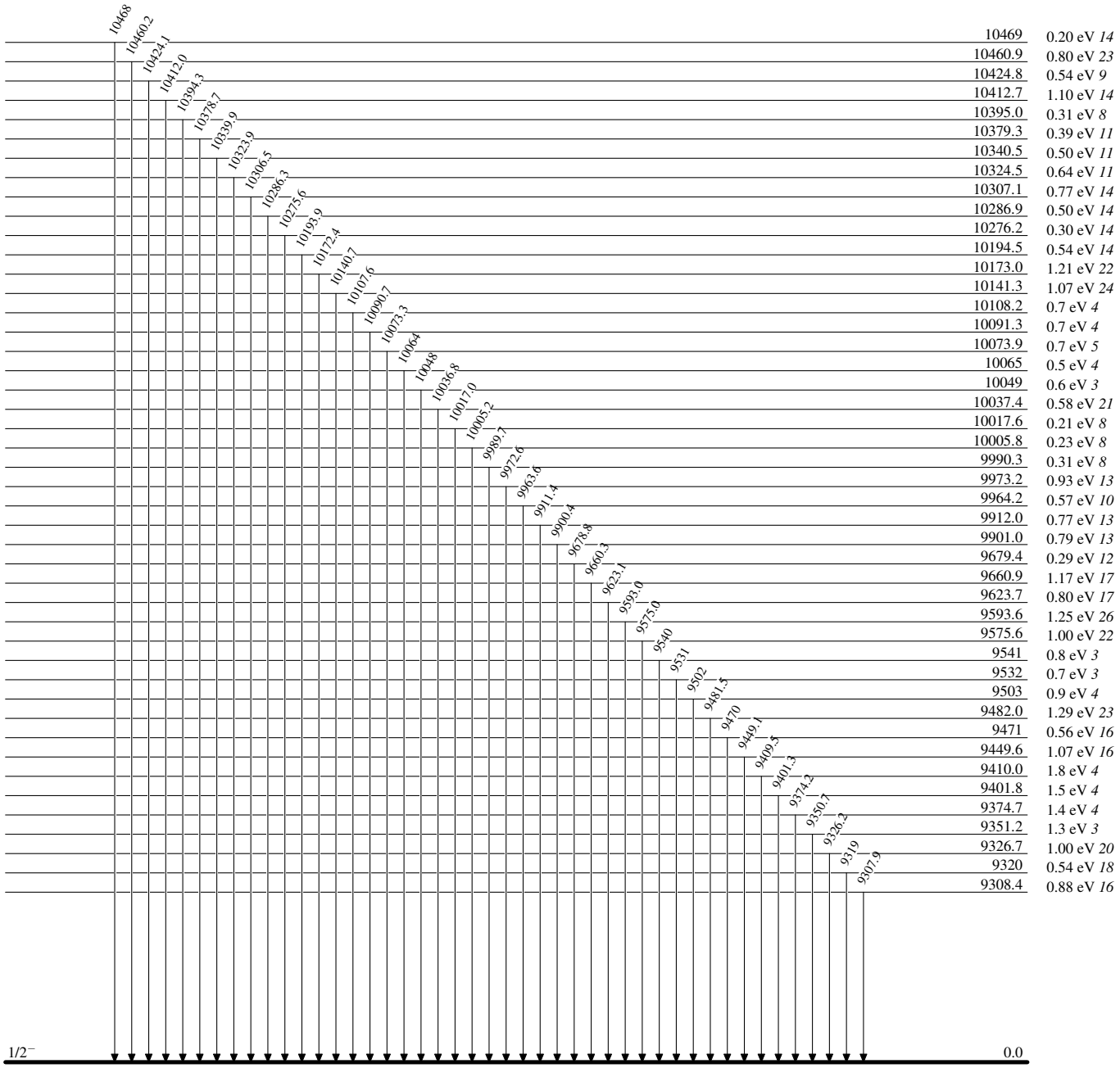


$^{89}_{39}Y_{50}$

^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05

Level Scheme (continued)

Intensities: % photon branching from each level

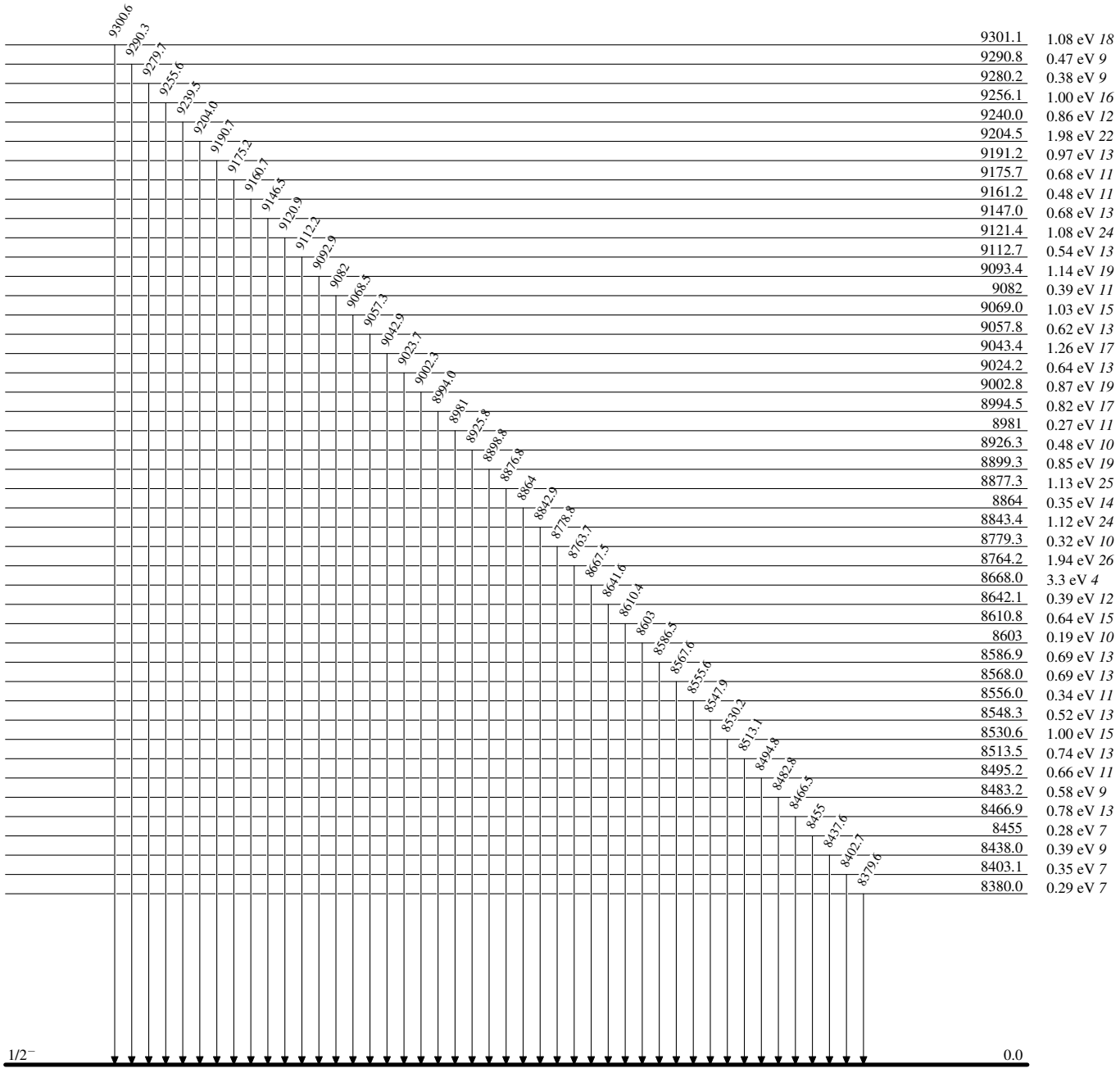


$^{89}_{39}Y_{50}$

^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05

Level Scheme (continued)

Intensities: % photon branching from each level

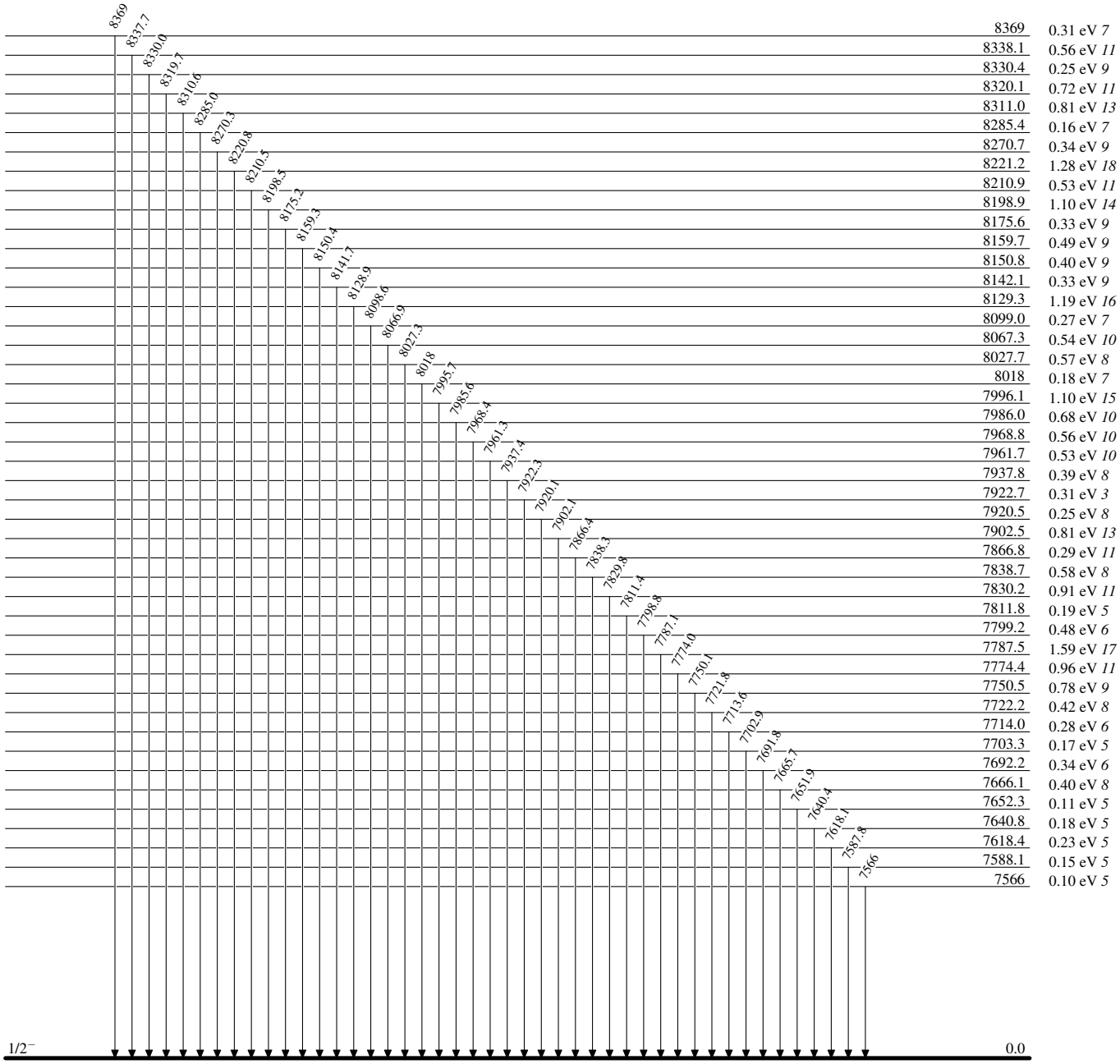


$^{89}_{39}Y_{50}$

^{89}Y(γ,γ′) 2009Be03,1997Re13,1993Hu05

Level Scheme (continued)

Intensities: % photon branching from each level

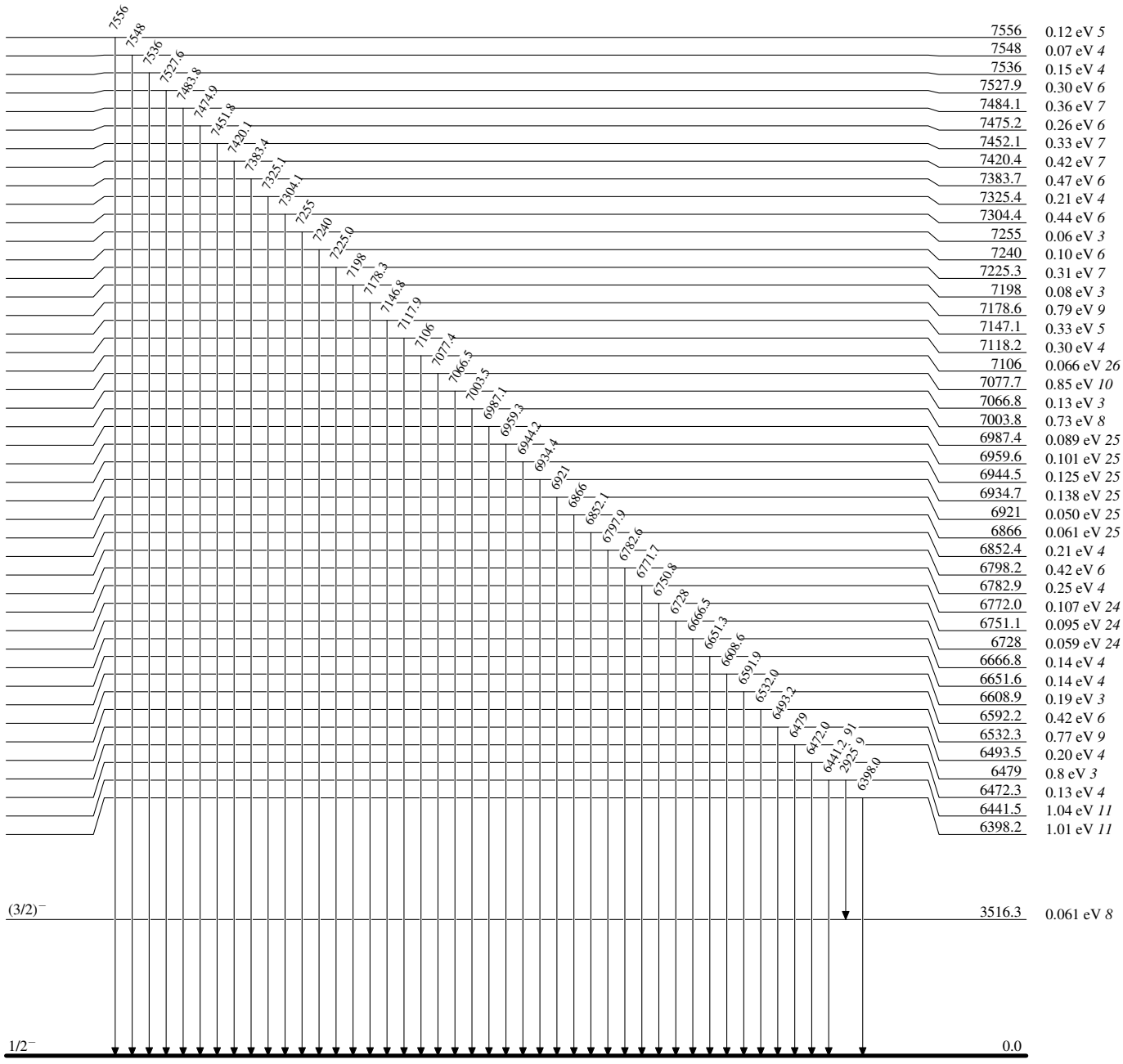


$^{89}_{39}Y_{50}$

^{89}Y(γ,γ') 2009Be03,1997Re13,1993Hu05

Level Scheme (continued)

Intensities: % photon branching from each level

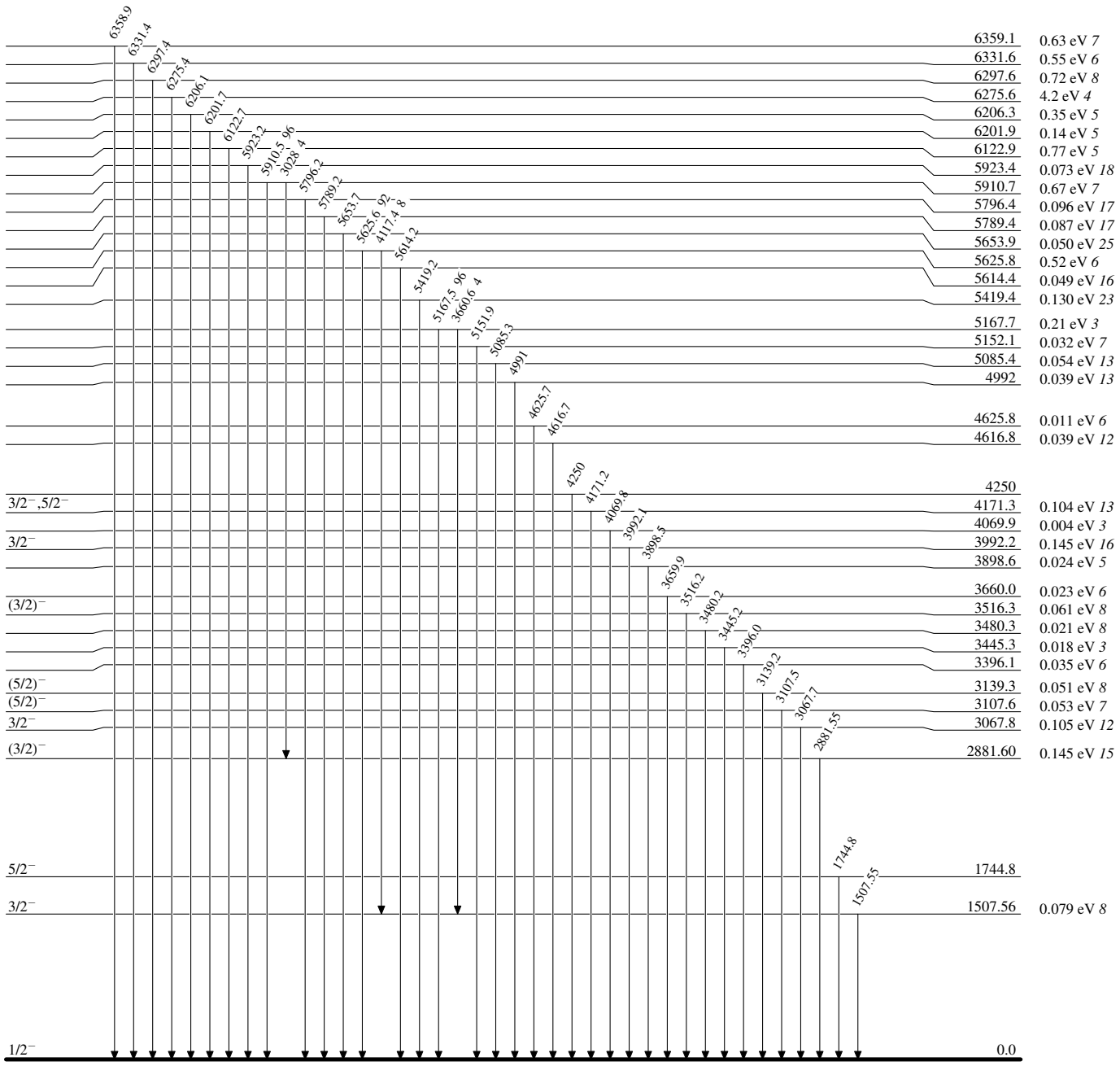


$^{89}_{39}Y_{50}$

^{89}Y(γ,γ') 2009Be03,1997Re13,1993Hu05

Level Scheme (continued)

Intensities: % photon branching from each level



$^{89}_{39}Y_{50}$