^{164}Dy(γ,γ') 1995Ma69

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 147, 1 (2018)	30-Nov-2017

1995Ma69: bremsstrahlung beam from electron beam of maximum energy 4.3 MeV. Measured Eγ, Iγ, γ(pol,θ), cross sections. Deduced widths.
1988We10: E=2.2-2.3 MeV; bremsstrahlung; isotopically enriched metallic sample (96.0% ^{164}Dy); measured γ-ray yields at 100°, 130°, 150°.

^{164}Dy Levels

E(level)[†]	J$^{\pi}$[‡]	Γ_0	Integrated cross section (eV b)	Comments
0.0	0^+			
73.5	2^+			
1675	1^-	0.0283 eV *35*	45 *4*	B(E1)↑=17.2×10^{-5} *21*
1841	$1^{(-)}$	0.0036 eV *8*	5.9 *11*	B(E1)↑=1.7×10^{-5} *4*
2052	$1^{(-)}$	0.0030 eV *7*	3.6 *7*	B(E1)↑=1.00×10^{-5} *24*
2330	1^-	0.0294 eV *33*	23.2 *19*	B(E1)↑=6.7×10^{-5} *7* Γ=0.065 eV *14* (deduced from data in 1988We10).
2412	$1^{(-)}$	0.0057 eV *12*	3.2 *5*	B(E1)↑=1.16×10^{-5} *24*
2531	1^+	0.0225 eV *19*	27.5 *21*	B(M1)↑=0.36 *3* Γ=0.035 eV *6* (deduced from data in 1988We10).
2540	1^+	0.0198 eV *17*	23.6 *18*	B(M1)↑=0.31 *3* Γ=0.028 eV *5* (deduced from data in 1988We10).
2578	1^+	0.0304 eV *25*	36.9 *28*	B(M1)↑=0.46 *4* Γ=0.045 eV *6* (deduced from data in 1988We10).
2653		0.0047 eV *4*	7.8 *7*	B(M1)↑=0.066 *6*; B(E1)↑=0.73×10^{-5} *7*
2671	1^-	0.0284 eV *27*	20.8 *16*	B(E1)↑=4.3×10^{-5} *4* Γ=0.055 eV *14* (deduced from data in 1988We10).
2694	1^+	0.0407 eV *33*	43.9 *32*	B(M1)↑=0.54 *4* Γ=0.058 eV *8* (deduced from data in 1988We10).
2828		0.0018 eV *3*	2.5 *4*	B(M1)↑=0.020 *3*; B(E1)↑=0.22×10^{-5} *4*
2862	1^+	0.0133 eV *11*	14.3 *11*	B(M1)↑=0.147 *12*
2986	$1^{(-)}$	0.0085 eV *17*	3.4 *5*	B(E1)↑=0.92×10^{-5} *18*
2990	$1^{(+)}$	0.0122 eV *11*	9.3 *7*	B(M1)↑=0.118 *11*
3027		0.0136 eV *9*	17.1 *12*	B(M1)↑=0.127 *9*; B(E1)↑=1.40×10^{-5} *10*
3070		0.0031 eV *4*	3.8 *4*	B(M1)↑=0.028 *3*; B(E1)↑=0.31×10^{-5} *4*
3112	1^+	0.139 eV *10*	112 *7*	B(M1)↑=1.19 *9* Γ=0.179 eV *22* (deduced from data in 1988We10).
3159	1^+	0.133 eV *9*	101 *7*	B(M1)↑=1.08 *8* Γ=0.21 eV *3* (deduced from data in 1988We10).
3173	1^+	0.111 eV *8*	92 *6*	B(M1)↑=0.90 *6* Γ=0.161 eV *21* (deduced from data in 1988We10).
3185		0.0030 eV *4*	3.4 *4*	B(M1)↑=0.024 *3*; B(E1)↑=0.26×10^{-5} *3*
3228	1^-	0.0199 eV *23*	7.7 *7*	B(E1)↑=1.69×10^{-5} *20*
3231		0.0066 eV *6*	7.2 *7*	B(M1)↑=0.050 *5*; B(E1)↑=0.56×10^{-5} *5*
3270	$1^{(-)}$	0.0109 eV *14*	4.8 *5*	B(E1)↑=0.89×10^{-5} *12*

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^{164}Dy(γ,γ') 1995Ma69 (continued)

^{164}Dy Levels (continued)

E(level)†	Jπ‡	Γ_0	Integrated cross section (eV b)	Comments
3279	$1^{(+)}$	0.0043 eV *7*	3.2 *5*	B(M1)↑=0.031 *5*
3293		0.0044 eV *19*	4.7 *20*	B(M1)↑=0.032 *14*; B(E1)↑=0.35×10^{-5} *15*
3316	$1^{(+)}$	0.0099 eV *12*	5.7 *6*	B(M1)↑=0.070 *9*
3365	$1^{(+)}$	0.0069 eV *25*	4.6 *10*	B(M1)↑=0.047 *17*
3414	$1^{(+)}$	0.0135 eV *15*	8.6 *8*	B(M1)↑=0.088 *9*
3603		0.0052 eV *6*	4.6 *6*	B(M1)↑=0.029 *4*; B(E1)↑=0.32×10^{-5} *4*
3621	1	0.0126 eV *26*	3.9 *6*	B(M1)↑=0.069 *14*; B(E1)↑=0.76×10^{-5} *15*
3667	1	0.0073 eV *11*	4.4 *6*	B(M1)↑=0.038 *6*; B(E1)↑=0.43×10^{-5} *6*
3695		0.0181 eV *21*	10.6 *11*	B(M1)↑=0.093 *11*; B(E1)↑=1.03×10^{-5} *12*
3704	$1^{(-)}$	0.0088 eV *16*	3.7 *6*	B(E1)↑=0.50×10^{-5} *9*
3718	1^{+}	0.0125 eV *14*	8.2 *8*	B(M1)↑=0.063 *7*
3754	$1^{(-)}$	0.0161 eV *24*	5.6 *7*	B(E1)↑=0.87×10^{-5} *13*
3765	$1^{(+)}$	0.0149 eV *17*	9.3 *9*	B(M1)↑=0.072 *8*
3785	1^{-}	0.089 eV *10*	26.8 *23*	B(E1)↑=4.7×10^{-5} *5*
3836		0.0129 eV *14*	10.1 *11*	B(M1)↑=0.059 *6*; B(E1)↑=0.65×10^{-5} *7*
3853		0.0109 eV *12*	8.4 *10*	B(M1)↑=0.049 *6*; B(E1)↑=0.54×10^{-5} *6*
3868	$1^{(-)}$	0.043 eV *6*	11.6 *13*	B(E1)↑=2.11×10^{-5} *30*
3877	1^{-}	0.052 eV *7*	13.6 *14*	B(E1)↑=2.55×10^{-5} *35*
3914	$1^{(-)}$	0.019 eV *5*	4.9 *10*	B(E1)↑=0.89×10^{-5} *22*
3987	$1^{(-)}$	0.024 eV *5*	6.3 *10*	B(E1)↑=1.08×10^{-5} *23*

† From Eγ data.
‡ From γ(θ) and γ(pol) data.

γ(^{164}Dy)

E_i(level)	J_i^π	E_γ	I_γ†	E_f	J_f^π	Mult.‡	Comments
73.5	2^+	73.5		0.0	0^+		E_γ: rounded value from Adopted Gammas.
1675	1^-	1601.5	160 *21*	73.5	2^+		R=1.83 *24*.
		1675	100	0.0	0^+	E1	Azimuthal asymmetry (in %)=−23 *8*.
1841	$1^{(-)}$	1767.5	110 *28*	73.5	2^+		R=1.24 *31*.
		1841	100	0.0	0^+		
2052	$1^{(-)}$	1978.5	128 *31*	73.5	2^+		R=1.43 *35*.
		2052	100	0.0	0^+		
2330	1^-	2256.5	170 *20*	73.5	2^+		R=1.87 *22*.
		2330	100	0.0	0^+	E1	Azimuthal asymmetry (in %)=−11 *5*.
2412	$1^{(-)}$	2338.5	249 *47*	73.5	2^+		R=2.73 *51*.
		2412	100	0.0	0^+		
2531	1^+	2457.5	47 *6*	73.5	2^+		R=0.51 *6*.
		2531	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+9.5 *41*.
2540	1^+	2466.5	50 *5*	73.5	2^+		R=0.55 *6*.
		2540	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+4.7 *41*.
2578	1^+	2504.5	43 *5*	73.5	2^+		R=0.47 *5*.
		2578	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+13 *4*.
2653		2653		0.0	0^+		
2671	1^-	2597.5	121 *13*	73.5	2^+		R=1.32 *14*.
		2671	100	0.0	0^+	E1	Azimuthal asymmetry (in %)=−11 *6*.
2694	1^+	2620.5	47 *5*	73.5	2^+		R=0.51 *5*.
		2694	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+7.5 *25*.
2828		2828		0.0	0^+		

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^{164}Dy(γ,γ') 1995Ma69 (continued)

$\gamma(^{164}Dy)$ (continued)

E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
2862	1^+	2788.5	31 *5*	73.5	2^+		R=0.33 *5*.
		2862	100	0.0	0^+	(M1)	Azimuthal asymmetry (in %)=+7 *8*.
2986	$1^{(-)}$	2912.5	226 *40*	73.5	2^+		R=2.43 *43*.
		2986	100	0.0	0^+		
2990	$1^{(+)}$	2916.5	70 *8*	73.5	2^+		R=0.75 *9*.
		2990	100	0.0	0^+		
3027		3027		0.0	0^+		
3070		3070		0.0	0^+		
3112	1^+	3038.5	47 *5*	73.5	2^+		R=0.50 *5*.
		3112	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+7.6 *13*.
3159	1^+	3085.5	50 *5*	73.5	2^+		R=0.54 *5*.
		3159	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+9.1 *15*.
3173	1^+	3099.5	39 *4*	73.5	2^+		R=0.42 *4*.
		3173	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+7.1 *16*.
3185		3185		0.0	0^+		
3228	1^-	3154.5	186 *22*	73.5	2^+		R=1.99 *23*.
		3228	100	0.0	0^+	(E1)	Azimuthal asymmetry (in %)=−10 *10*.
3231		3231		0.0	0^+		Azimuthal asymmetry (in %)=+11 *9*.
3270	$1^{(-)}$	3196.5	142 *19*	73.5	2^+		R=1.52 *20*.
		3270	100	0.0	0^+		
3279	$1^{(+)}$	3205.5	45 *12*	73.5	2^+		R=0.48 *13*.
		3279	100	0.0	0^+		
3293		3293		0.0	0^+		
3316	$1^{(+)}$	3242.5	82 *12*	73.5	2^+		R=0.88 *13*.
		3316	100	0.0	0^+	(M1)	Azimuthal asymmetry (in %)=+15 *16*.
3365	$1^{(+)}$	3291.5	52 *46*	73.5	2^+		R=0.56 *50*.
		3365	100	0.0	0^+		
3414	$1^{(+)}$	3340.5	55 *8*	73.5	2^+		R=0.59 *9*.
		3414	100	0.0	0^+		
3603		3603		0.0	0^+		Azimuthal asymmetry (in %)=−17 *17*.
3621	1	3547.5	188 *36*	73.5	2^+		R=2.00 *38*.
		3621	100	0.0	0^+		
3667	1	3593.5	44 *10*	73.5	2^+		R=0.47 *11*.
		3667	100	0.0	0^+		
3695		3621.5	44 *7*	73.5	2^+		R=0.47 *8*.
		3695	100	0.0	0^+		
3704	$1^{(-)}$	3630.5	98 *20*	73.5	2^+		R=1.04 *21*.
		3704	100	0.0	0^+		
3718	1^+	3644.5	27 *6*	73.5	2^+		R=0.29 *6*.
		3718	100	0.0	0^+	M1	Azimuthal asymmetry (in %)=+17 *12*.
3754	$1^{(-)}$	3680.5	137 *22*	73.5	2^+		R=1.45 *23*.
		3754	100	0.0	0^+		
3765	$1^{(+)}$	3691.5	29 *8*	73.5	2^+		R=0.31 *8*.
		3765	100	0.0	0^+		
3785	1^-	3711.5	168 *20*	73.5	2^+		R=1.78 *21*.
		3785	100	0.0	0^+	(E1)	Azimuthal asymmetry (in %)=−6 *6*.
3836		3836		0.0	0^+		
3853		3853		0.0	0^+		
3868	$1^{(-)}$	3794.5	184 *26*	73.5	2^+		R=1.94 *28*.
		3868	100	0.0	0^+		
3877	1^-	3803.5	193 *27*	73.5	2^+		R=2.04 *29*.
		3877	100	0.0	0^+	E1	Azimuthal asymmetry (in %)=−17 *9*.
3914	$1^{(-)}$	3840.5	187 *43*	73.5	2^+		R=1.98 *46*.
		3914	100	0.0	0^+		

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^{164}Dy(γ,γ') 1995Ma69 (continued)

$\gamma(^{164}Dy)$ (continued)

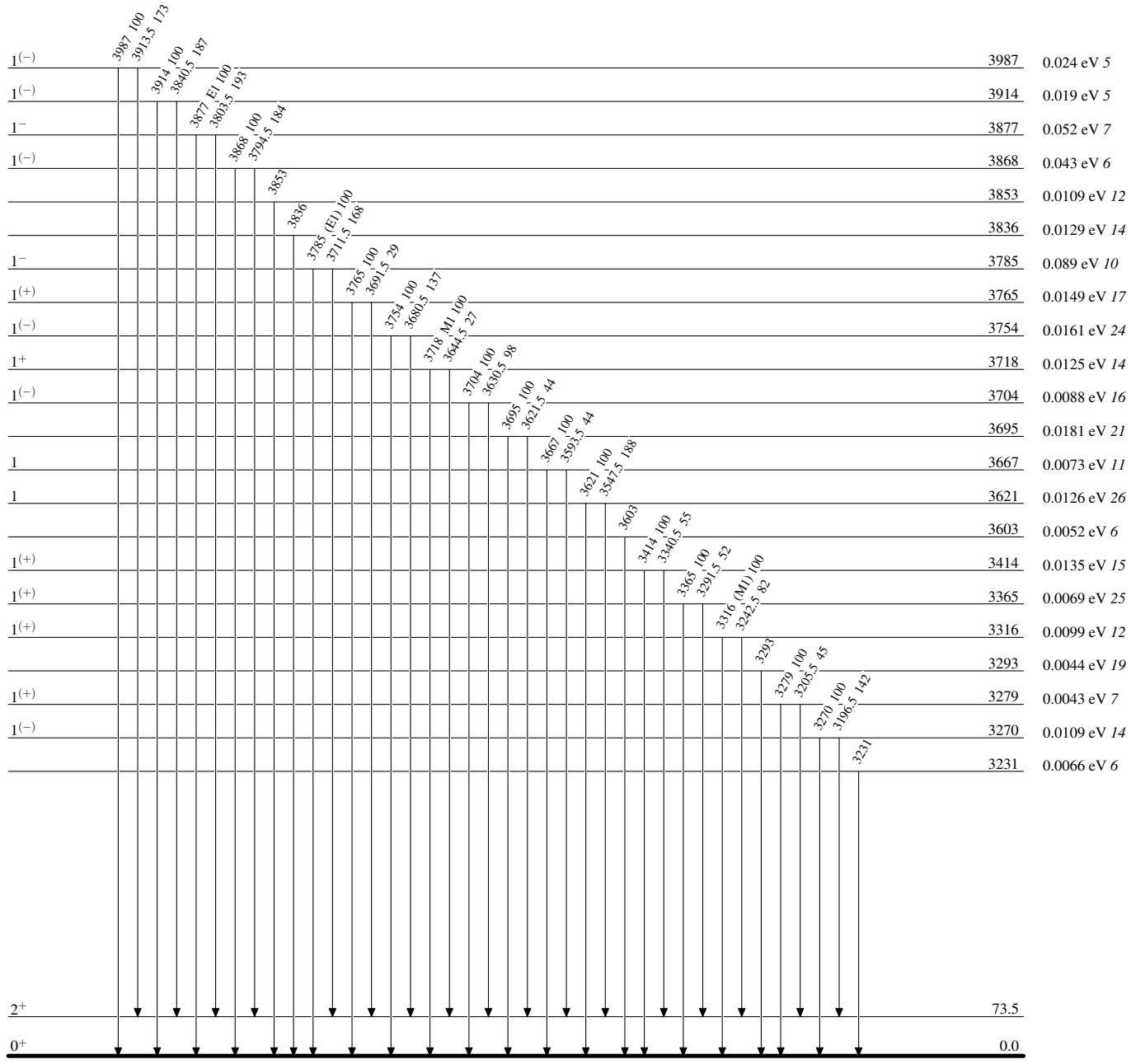
E_i(level)	J_i^π	E_γ	I_γ[†]	E_f	J_f^π	Comments
3987	$1^{(-)}$	3913.5	173 *36*	73.5	2^+	R=1.83 *38*.
		3987	100	0.0	0^+	

[†] Relative branching ratios deduced from reduced branching ratios R=[Iγ(to 2^+)/Eγ(to 2^+)^3]/[Iγ(to g.s.)/Eγ(to g.s.)^3], given under comments.
[‡] As implied by measured azimuthal asymmetries. Positive values correspond to M1 and negative to E1.

^{164}Dy(γ,γ') 1995Ma69

Level Scheme

Intensities: Relative photon branching from each level

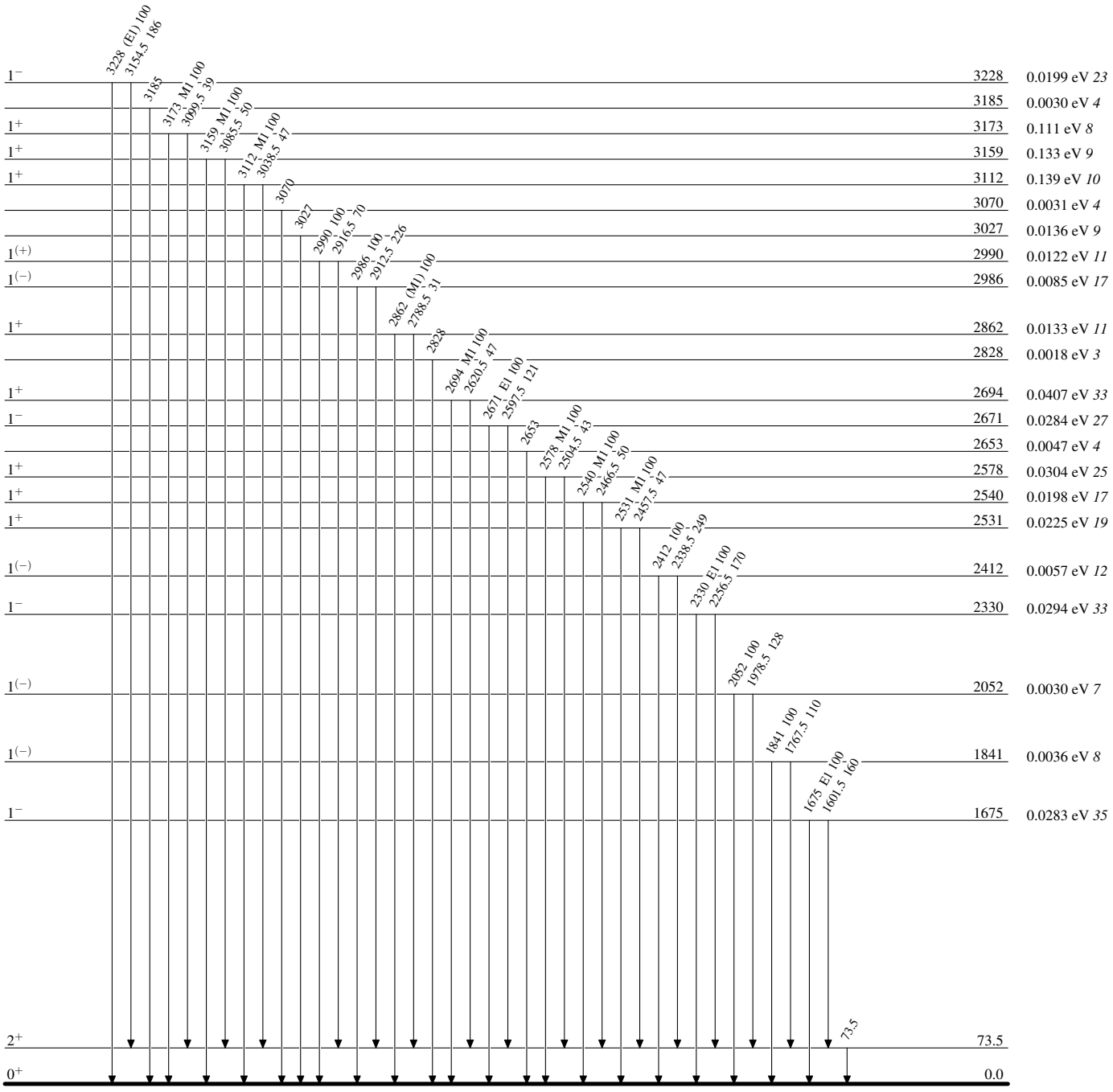


$^{164}_{66}Dy_{98}$

^{164}Dy(γ,γ') 1995Ma69

Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{164}_{66}Dy_{98}$