^{94}Zr(n,n′γ) 1978Gl04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. Abriola(a), A. A. Sonzogni	NDS 107, 2423 (2006)	1-Jan-2006

^{94}Zr Levels

E=2.2 MeV to 3.7 MeV. Enriched target. Ge(Li), FWHM=2.5 keV at 1.33 MeV. Measured Eγ, σ(n) and γ(θ), excitation functions. Compared γ(θ) and σ(n) to Wolfenstein-Hauser-Feshbach calculations.
Other: 1972Te03, 1970Te03.
δ_L is the deformation length: $\delta_L=\beta_L R$, where R is the nuclear radius.

E(level)	Jπ†	δ_L (fm)‡	E(level)	Jπ†	E(level)	Jπ†
0	0^+		2329.1 *10*	4^+	2859.8 *13*	4^+
918.4 *5*	2^+	0.65 *5*	2365.7 *6*	2^+	2887.9 *18*	
1299.9 *6*	0^+		2507.6 *7*	(3^+)	2943.3 *14*	
1468.8 *7*	4^+	0.34 *4*	2603.7 *11*	5^-	3059.3 *25*	
1671.5 *6*	2^+	0.33 *3*	2698.2 *11*	(1,2,3)	3156.3 *10*	
2057.1 *7*	3^-	0.94 *5*	2826.1 *8*	(2,3)	3218.7 *9*	3^-
2150.4 *9*	2^+		2846 *5*	(1^-)	3360 *3*	3^-

† From Adopted Levels.
‡ Deformation length, average from values at 8, 24 MeV in (n,n′) (1988Wa27,1990Wa13). 1988Wa27 deduce ratios between proton and neutron transition matrix elements and find them different from the values of 1987Ry01 who measured σ(θ) for ^{94}Zr(α,α′) at 35.4 MeV.

γ(^{94}Zr)

E_i(level)	J_i^π	E_γ	I_γ†	E_f	J_f^π	Mult.‡	δ#	Comments
918.4	2^+	918.3 *5*		0	0^+			
1299.9	0^+	381.4 *5*		918.4	2^+			
1468.8	4^+	550.5 *5*		918.4	2^+			
1671.5	2^+	752.3 *8*	59	918.4	2^+			
		1671.8 *8*	41	0	0^+			
2057.1	3^-	1138.3 *6*		918.4	2^+			
2150.4	2^+	1232.0 *7*		918.4	2^+	M1+E2	−1.7 *+8−14*	
2329.1	4^+	1410.7 *9*		918.4	2^+	E2(+M3)	−0.13 *+13−9*	
2365.7	2^+	308.4 *8*	9	2057.1	3^-	E1(+M2)	+0.04 *+22−27*	
		694.2 *10*	52	1671.5	2^+	M1(+E2)		δ: −0.09 *+9−13* or +3.2 *+13−10*.
		1065.7 *5*	6	1299.9	0^+	E2		
		1447.5 *8*	33	918.4	2^+	M1+E2	+0.64 *+14−12*	
2507.6	(3^+)	836.0 *7*	13	1671.5	2^+	M1+E2	−0.84 *4*	
		1589.5 *9*	87	918.4	2^+	M1+E2		δ: +0.70 *+8−12* or +2.1 *+10−2*.
2603.7	5^-	1134.9 *8*		1468.8	4^+			
2698.2	(1,2,3)	1779.7 *10*		918.4	2^+	D+Q		δ: −0.8 *+4−7* if J=1 −0.22 *5* or δ=+5.7 *+19−21* if J=2 +0.22 *+5−3* if J=3.
2826.1	(2,3)	1154.6 *6*		1671.5	2^+	D+Q		δ: +0.04 *+13−4* or δ=+1.9 *+5−4* if J=2, δ=+0.36 *5* or δ=+5.7 *+19−12* if J=3.
2846	(1^-)	2846 *5*		0	0^+			
2859.8	4^+	1391.0 *11*		1468.8	4^+	D+Q		δ: −0.13 *+40−23* if J=4, δ=+0.41 *+11−19* or δ=+3.2 *+25−16* if J=5.
2887.9		1969.4 *17*		918.4	2^+			δ: −0.8 *+6−12* if J=1, δ=−0.22 *+4−10* if J=2, δ=+0.22 *+5−4* if J=3 pure E2 and J=0 also possible.

Continued on next page (footnotes at end of table)

^{94}Zr(n,n′γ) 1978Gl04 (continued)

γ(^{94}Zr) (continued)

E_i(level)	J_i^π	E_γ	E_f	J_f^π	Comments
2943.3		886.2 *12*	2057.1	3^-	
3059.3		1384.9[@] *10*	1671.5	2^+	1978Gl04 place this γ from a level at 3056.8 keV *11* together with the 2140.9 keV *25* γ. The latter one is probably identical to the 2140.6 keV *2* γ deexciting the 3059.4 level in β^- decay. However, with the smaller uncertainty from β^- decay the 2140γ and 1384γ do not fit into the level scheme. The evaluator therefore concludes that the 1384γ is misplaced in (n,n′γ). Also the excitation function of the 1384γ seems to indicate a level lower than the 3056.
		2140.9 *25*	918.4	2^+	
3156.3		648.7 *8*	2507.6	(3^+)	
		2237.3 *25*	918.4	2^+	
3218.7	3^-	1161.3 *7*	2057.1	3^-	
		1751.1 *13*	1468.8	4^+	
3360	3^-	2442 *3*	918.4	2^+	

† Branching ratios for each level.
‡ From γ(θ) in (N,N′γ). The parity is deduced from the adopted J^π.
# From γ(θ) in (N,N′γ).
@ Placement of transition in the level scheme is uncertain.

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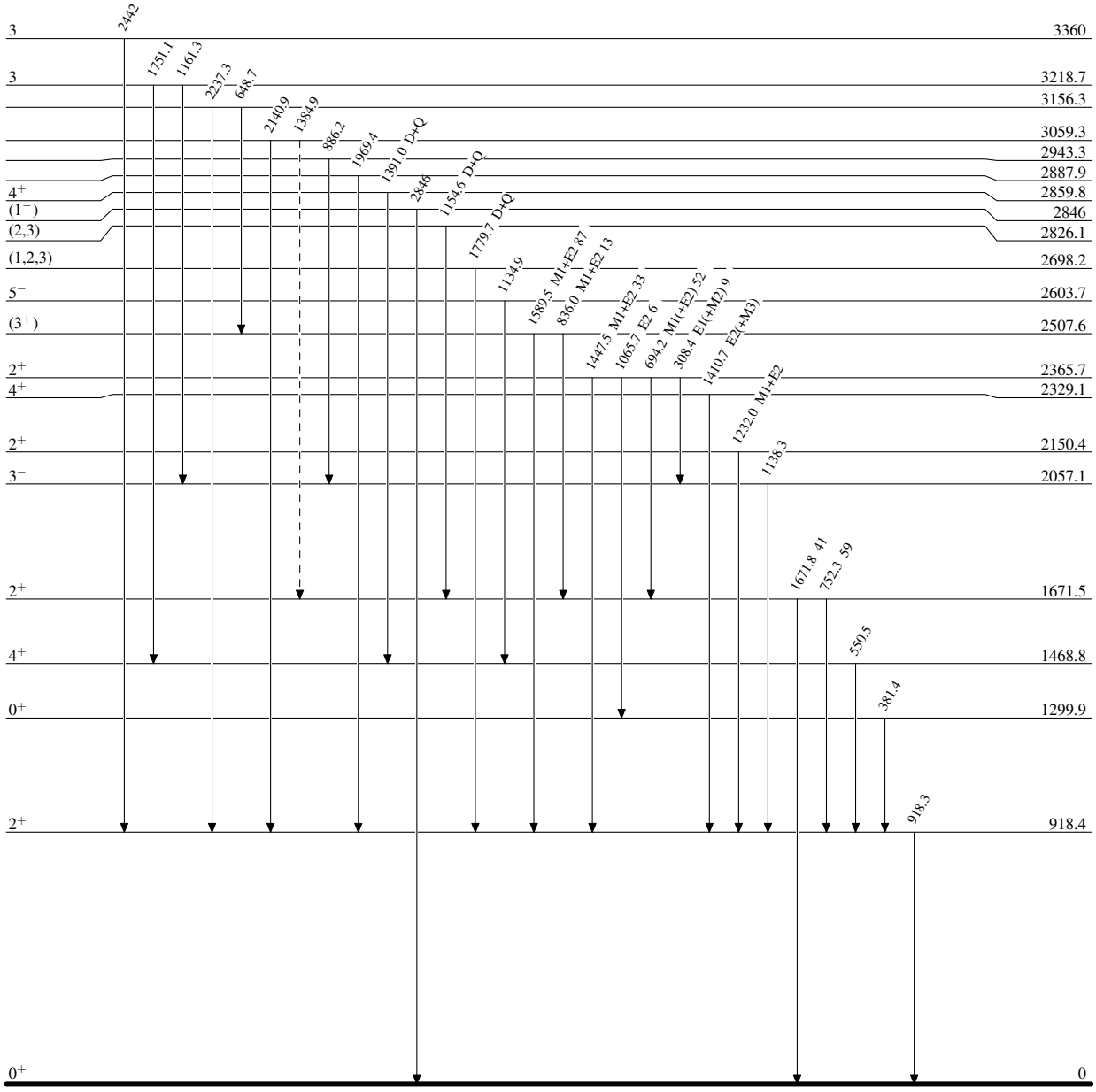
Legend

Level Scheme

Intensities: % photon branching from each level

- - - - - - ► γ Decay (Uncertain)



$^{94}_{40}Zr_{54}$