^{89}Y(p,γ) 1969Ir01,1979Sz06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. Mccutchan	NDS 165,1 (2020)	1-Mar-2020

1967Bl07: E=2.8-10 MeV. Measured σ(E), W(θ), scin.
1969Ir01: E=3930 keV. Measured σ(Eγ), semi.
1973Ha62: E=5.4-17.0 MeV. Measured σ(E,Eγ,θ), scin.
1974Ra04: E=4.82 MeV. Measured Eγ, Iγ, semi.
1979Sz06: E=2.2-3.4 MeV. Measured Eγ, Iγ, semi. Deduced gamma-ray strength function.
1987Sz02: E=3.7-11.5 MeV. Measured σ(E,Eγ), semi. Deduced spectroscopic factors.
1993Sa38: E=4 MeV. Measured Eγ, Iγ, $\gamma(\theta)$, levels half-life. Doppler-shift attenuation, Detector: NaI.
2013Ha03: E=2,3,4 and 4.8 MeV; 4$\pi\gamma$ summing technique using NaI(Tl) detector; measured Eγ, Iγ, I$\gamma(\theta)$, angle integrated cross-section; deduced astrophysical S-factor and reaction rates; statistical model calculations; TALYS code.
2015Ne07: E=3.65 to 4.70 MeV. Measured σ(E), Eγ, Iγ.
The analog states are superimposed on the broad giant dipole resonance centered at E(level)≈16500 with a width Γ≈4000 (1973Ha62).
Other: 2014Ne18.

^{90}Zr Levels

E(level)[†]	J$^{\pi}$[d]	T$_{1/2}$[‡]	Comments
0	0$^+$		
1762[b] *3*	0$^+$		C2S=0.80.
2187[b] *3*	2$^+$	82 fs *+16−12*	
2320[&b]	5$^-$		C2S=1.16.
2740[&]	(4)$^-$		C2S=0.97.
2748 *3*	3$^-$		
3081 *3*	4$^+$		
3308 *3*	2$^+$	96 fs *+6−5*	
3842 *3*	2$^+$	14 fs *+6−4*	
4126 *3*	0$^+$		
4233 *3*			
4424 *3*	0$^+$		
4581 *3*	1$^+$	8.7 fs *+13−9*	
4681 *3*	2$^+$		
4992 *3*			
5095 *3*			
5108 *3*	3$^-$		
5187 *3*	0$^+$,1$^+$,2$^+$		
5275.2[a]	(2$^+$)	0.8 ps *+2−1*	
5308 *3*			
6640.1[a]	(2$^+$)	21 fs *+7−6*	
7649.6[a]	(2$^+$)	0.55 ps *+9−7*	
11936[c] *26*			
12220 *3*			
12482[c] *28*			
12779[c] *29*			
12977[c] *26*			
13110[@]			E(level): Probable analog of ^{90}Y g.s. E(p)(lab)=4810.
13310[@]			E(level): Probable analog of ^{90}Y(203). E(p)(lab)=5010.
14430[#]			E(level): Probable analog of ^{90}Y(1371). E(p)(lab)=6140.
15500[#]			E(level): E(p)(lab)=7220.
15700[#]			E(level): E(p)(lab)=7420.

Continued on next page (footnotes at end of table)

^{89}Y(p,γ) 1969Ir01,1979Sz06 (continued)

^{90}Zr Levels (continued)

E(level)[†]	Comments
15900[#]	E(level): E(p)(lab)=7620.
16290[#]	E(level): Probable analog of ^{90}Y(3145). E(p)(lab)=8020.
17300[#]	E(level): E(p)(lab)=9000.
19400[#]	E(level): Possible analog resonance. E(p)(lab)=11100.
20800[#]	E(level): Possible analog resonance. E(p)(lab)=12550.

† From 1979Sz06, except as noted.
‡ From Doppler-shift attenuation method (1993Sa38).
# From 1973Ha62. For resonance parameters, see 1973Ha62. Calculated from E(p) by evaluators using S(p)=8353.1 keV *16* (2017Wa10).
@ From 1967Bl07. Calculated from E(p) by evaluators using S(p)=8353.1 keV *16* (2017Wa10).
& From 1987Sz02.
a From 1993Sa38.
b 2013Ha03 confirmed population of this level from sum peaks and entry state at 11.317 MeV.
c From 2015Ne07.
d From the Adopted Levels.

γ(^{90}Zr)

E_i(level)	J_i^π	E_γ	I_γ[@]	E_f	J_f^π	Mult.	Comments
4581	1^+	4582.7[#]		0	0^+	(E2)[#]	Mult.: Assigned (E2) multi-polarity is not consistent with $J^\pi=1^+$, as adopted for 4581 level.
5275.2	(2^+)	5275.2[#]		0	0^+	(E2)[#]	
6640.1	(2^+)	6640.1[#]		0	0^+	(E2)[#]	
7649.6	(2^+)	7649.6[#]		0	0^+	(E2)[#]	
12220		8383[†] *6*	18	3842	2^+		
		8919[†] *6*	26	3308	2^+		
		9467[†] *6*	16	2748	3^-		
		10033[†] *6*	47	2187	2^+		
		10453[†] *6*	40	1762	0^+		
		12212[†] *6*	100	0	0^+		
13110		9270[‡]		3842	2^+		
		9800[‡]		3308	2^+		
		10360[‡]		2748	3^-		
		10920[‡]		2187	2^+		
		11350[‡]		1762	0^+		
		13110[‡]		0	0^+		

† From 1969Ir01.
‡ Approximate Eγ from level energy difference. Observed by 1974Ra04.
# From 1993Sa38.
@ From 1969Ir01.

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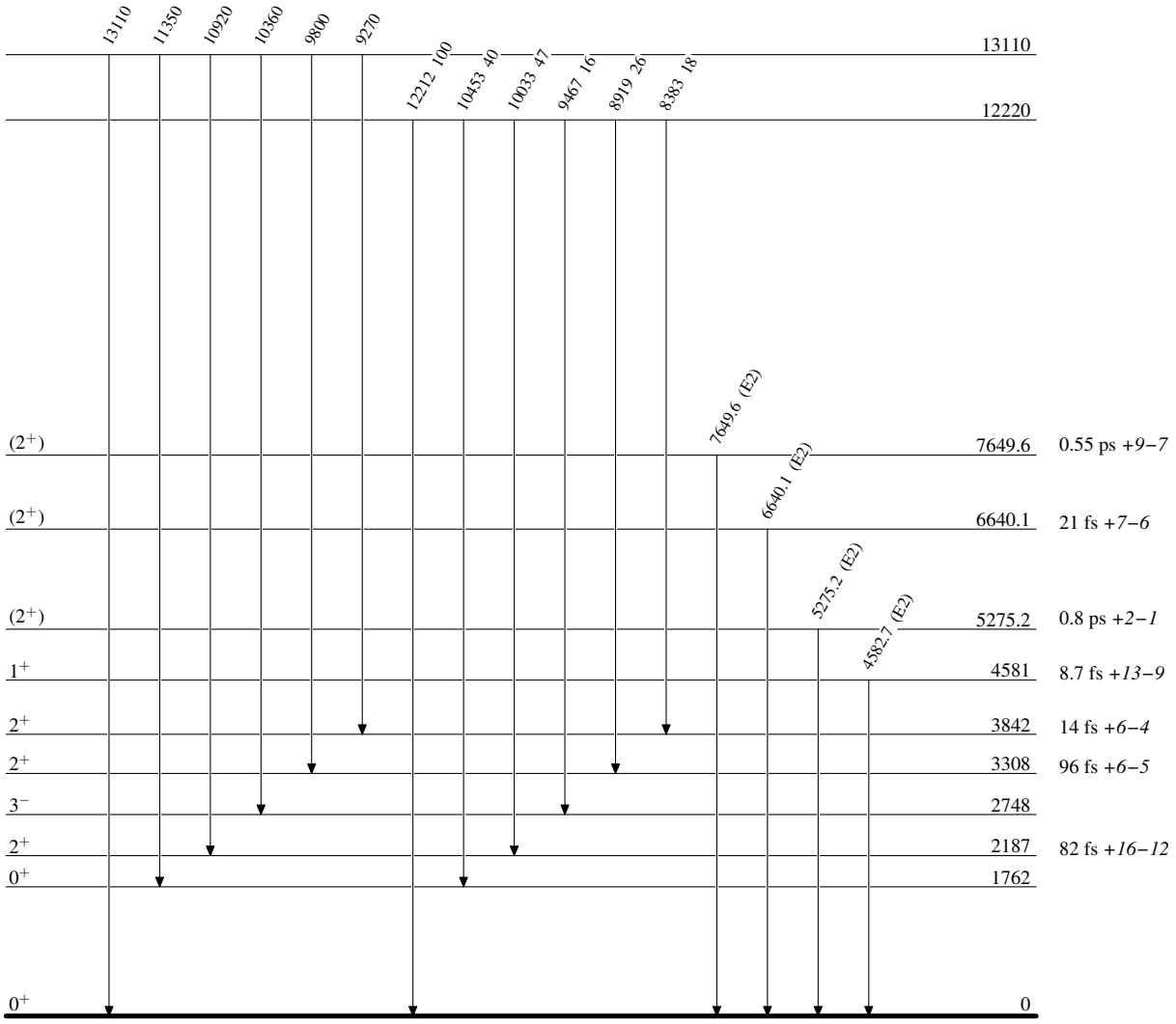
Level Scheme

Intensities: % photon branching from each level



$^{90}_{40}Zr_{50}$