^{91}Zr(d,p), (pol d,p) 1980Bi03,1979Bo35,1975Ip01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113, 2187 (2012)	15-Sep-2012

$J^\pi(^{91}Zr)=5/2^+$.

Others: 1979St23, 1970Bi03, 1967Di05, 1963Co10.

1980Bi03: E(pol d)=12 MeV; 90.9% ^{91}Zr metallic foil targets; four ΔE-E cooled solid-state counter telescopes, FWHM≈55 *6565* keV; θ(lab)=20°−110°. 12 levels.

1979Bo35: E(d)=12 MeV; Enge split-pole magnetic spectrograph, FWHM=11-14 keV; θ(lab)=8°−55°. 64 levels.

1975Ip01: E(d)=12 MeV; multichannel magnetic spectrograph, FWHM=8 keV; θ(lab)=5°−87.5°. 35 levels.

1970Bi03: E(d)=33.3 MeV; broad-range spectrograph, FWHM=25 keV, 3° acceptance angle; θ(lab)=12.5°−42.5°. 43 levels.

All: DWBA analysis of σ(θ). 1980Bi03: DWBA analysis of vector analyzing power, also.

^{92}Zr Levels

E(level)[†]	L[‡]	S′[#]	E(level)[†]	L[‡]	S′[#]	E(level)[†]	L[‡]	S′[#]
0.0	2	0.18	3725 *9*	2	0.13	4670 *12*	2	0.014
935 *2*	0+2	0.040,0.90	3781 *9*	2	0.15	4724 *12*	(0+4)[h]	0.002,0.19
1381 *3*	2	0.008	3814 *10*	2	0.14[n]	4789 *12*	(0+2+4)	[d]
1497 *4*	2	2.0	3891 *10*	[f]	[f]	4799?[a]	(5)[a]	[a]
1848 *5*	2	0.25	3902 *10*	[f]	[f]	4813 *12*	[l]	[l]
2068 *5*	0+(2)[g]	0.18,0.12	3910?[a]	(5)[a]	0.20[a]	4821 *12*	[l]	[l]
2342 *6*	3[e]	0.026[e]	3971 *10*	[i]	[i]	4847 *12*	(3)	0.028
2401 *6*	2	0.13	3983 *10*	[i]	[i]	4894 *12*	(2+4)	0.016,0.26
2823 *7*	0[g]	0.012	4012[@] *10*	2	0.40[@n]	4931 *12*	3	0.091[o]
2867 *7*	2	0.19	4049 *10*	2	0.052	4977 *12*	[m]	[m]
2911 *7*	0	0.49	4093[b] *10*	2	0.51	4982 *12*	[m]	[m]
2960 *7*	4	0.23	4142 *10*	0+2	0.092,0.095	5012 *13*	3	0.075
3059 *8*	0	0.25	4183 *10*	(2+4)	0.047,0.90	5040 *13*	(3)	0.025
3126?[&] *8*	2	0.013[&]	4213 *11*	0+(2)	0.010,0.012	5067 *13*	0+2	0.007,0.01
3191 *8*	(3+5)[h]	0.023,0.26	4260 *11*	2	0.029	5091 *13*	2	0.033
3240 *8*	(2+4)[h]	0.011,0.22	4295?[a]	[a]	[a]	5116 *13*	2	0.025
3267 *8*	0+2	0.034,0.070	4367?[a]	(4)[a]	0.33[a]	5197 *13*		
3291 *8*	0	0.17	4453 *11*	[j]	[j]	5215 *13*		
3325? *8*	(4)[h]	0.28[n]	4465 *11*	[j]	[j]	5265?[a]	(5)[a]	[a]
3374? *8*	(3)	0.022[o]	4494 *11*	[k]	[k]	5278 *13*	(2),(3)	0.067,0.091
3469 *9*	2	0.18	4504 *11*	[k]	[k]	5310 *13*	(0+2+4)	[d]
3602[@] *9*	(3+5)[h]	0.022,0.4[@]	4520?[a]	(4)[a]	0.24[a]	5358 *13*	3	0.045
3655[@] *9*	2+4	0.091,0.5[@]	4604 *12*	2	0.026	5500?[c]	(1)	0.25
3704 *9*	2	0.10	4640 *12*	3	0.033			

† From 1979Bo35, unless indicated otherwise. For E<3500 keV, data of 1979Bo35 agree within 4 keV with precise values for E derived from γ ray data in Adopted Levels. 1975Ip01 report the same levels up to their limit of 4200 keV, except for the 3126? and 3902 levels of 1979Bo35. However, E values from 1970Bi03 and 1975Ip01 are systematically lower than those of 1979Bo35 by 10-30 and 15-25 keV, respectively. Unconfirmed levels reported at 2150, 4580 keV (1967Di05 only) have been omitted here, while those at 3910, 4295, 4367, 4520, 4799 and 5265 keV (1970Bi03 only) are considered by the evaluator to be doubtful and are omitted from Adopted Levels.

‡ From 1979Bo35. L values from 1975Ip01 and 1980Bi03 agree in most cases.

\# $S'=(2J_f+1)/(2J_i+1)xS$ from 1979Bo35. For L=2 pick-up, a $d_{5/2}$ or $d_{3/2}$ orbital was ascribed, respectively, to states above or below 3 MeV, based on observed concentrations of L=2 strength near 1.5 and 4 MeV. Typically, S′ values from 1979Bo35 are ≈30% lower than those from 1975Ip01, attributable to ≈15% lower dσ/dΩ and to bound state parameter dependence of DWBA

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^{91}Zr(d,p), (pol d,p) 1980Bi03,1979Bo35,1975Ip01 (continued)

^{92}Zr Levels (continued)

analysis. 1980Bi03 also report S′ values larger than those of 1979Bo35.

[@] Corrected by 1979Bo35 for ^{90}Zr(d,p) contribution.

[&] Corrected by 1979Bo35 for ^{94}Zr(d,p) contribution.

[a] Reported by 1970Bi03 only. See general comment concerning energy scale discrepancies.

[b] Possible doublet (1979Bo35).

[c] From 1963Co10. Considered doubtful by evaluator, on account of very limited (75-100 keV) resolution. Angular distribution was not shown.

[d] For L=0,2,4 components, respectively, S′=0.004,0.015,0.21 for 4789 level and 0.003,0.008,0.38 for 5310 level; however, authors consider analysis to be very tentative.

[e] L=3,5 in 1975Ip01 (S′=0.03,0.21) and 1980Bi03 (S′=0.11,0.28).

[f] L=3,5 (S′=0.045, 0.44) provides best fit but L=4 (as in 1975Ip01) with S′=0.63 cannot be ruled out for 3891+3902 doublet.

[g] Neither 1975Ip01 nor 1980Bi03 (S′≤0.08) require L=2 component for 2823 level; however, 1975Ip01 do require it for 2068 level, whereas 1980Bi03 and 1979Bo35 do not. 1979Bo35 note that small L=2 component is difficult to extract in presence of strong L=0 component.

[h] Data have poor statistics; very tentative L-decomposition (1979Bo35). See 1979Bo35 for detailed discussion of discrepancies with assignments from 1975Ip01.

[i] L=^{2,}S′=0.074 for 3971+3983 doublet.

[j] L=^{2,}S′=0.082 for 4453+4465 doublet.

[k] L=^{2,}S′=0.094 for 4494+4504 doublet.

[l] L=(2+4), S′=0.017,0.72 for 4813+4821 doublet.

[m] L=^{2,}S′=0.10 for 4977+4982 doublet.

[n] Corrected by 1979Bo35 for contribution from known ^{92}Zr(d,p) state.

[o] May include a small contribution from a known ^{92}Zr(d,p) state.