

⁹²Zr(d,p) 1973Bi04,1972BaZP

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 112, 1163 (2011)	15-Dec-2010

Additional information 1.

Others: 1972Ke24, 1972Fa05, 1970Cl05, 1968He02, 1963Co10.

1973Bi04: E=33.3 MeV, FWHM≈25 keV, $\theta(\text{lab})=12.5^\circ$ to 42.5° (5° steps); magnetic spectrograph + nuclear emulsions, 95.7% ⁹²Zr target; DWBA analysis of $\sigma(\theta)$.

1972BaZP: E=13 MeV, FWHM=35-45 keV, $\theta=15^\circ-120^\circ$. Enriched target (93.8%), semi $\Delta E-E$ telescope.

1972Fa05: E=12 MeV, FWHM=15 keV, $\theta(\text{lab})=15^\circ$ to 70° , spectrograph + nuclear emulsions; DWBA analysis of $\sigma(\theta)$.

1972Ke24: E=4.0 MeV (additional data at 3.5 and 4.5 MeV not fully analyzed), 95% ⁹²Zr target, $\theta=55^\circ-165^\circ$ (10° steps), DWBA analysis of $\sigma(\theta)$.

1970Cl05: E=4.2 MeV to 11.2 MeV, 94.6% ⁹²Zr target, Si(Li) detectors, FWHM=40-50 keV; DWBA analysis of excitation functions at $\theta=138^\circ$ and $\theta=168^\circ$.

1968He02: E=5.0-9.7 MeV; Si(Li) detectors; $\theta(\text{lab})=165^\circ, 145^\circ, 90^\circ$; measured excit; investigated σ anomalies in vicinity of (d,n) threshold for corresponding IAS.

1963Co10: E=15 MeV, FWHM=75-100 keV, $\theta=9^\circ, 17^\circ, 30^\circ, 40^\circ$; DWBA analysis of $\sigma(\theta)$.

⁹³Zr Levels

E(level) [†]	L [‡]	(2J+1)S [‡]	Comments
0	2	3.84	
272 5	2	≈0.016	L from 1972BaZP and 1973Fa05. S'=0.042 in 1972BaZP, but peak is subject to contamination by strong (g.s.) proton group from ⁹⁴ Zr(d,p).
942 5	0	1.84	
1018?@	0#	0.26#	
1151?@	0#	0.040#	1972Fa05 searched for, but failed to find, this state.
1222?@	0#	0.012#	
1419 5	2	1.28	
1463 5	4	2.96	
1598 5	4	0.29	Other data: L=2, S'=0.079 from 1972BaZP. L=4 in 1970Cl05 and 1963Co10.
1648	2	0.11	E from 1972Fa05; L and S' from 1972BaZP.
1735?@			
1896 5	0	0.46	
2025 10	5	2.64	
2075 10	4	0.58	L=(2), S'=0.20 from 1972Fa05.
2100	0	0.14	E and L from 1972Fa05; S' from 1972BaZP.
2181			From 1972BaZP only.
2276?@			
2302 10			L: (2), (2,3), (4), 4, 3 from 1973Bi04, 1972Fa05, 1970Cl05, 1963Co10, 1972BaZP, respectively.
2363 10	5	0.132	
2391?@	0#	0.008#	
2464 10	2	0.80	
2537&	2&	0.39&	
2555&	2&	0.15&	
2638 10	4	0.80	
2662 10	5	0.96	
2716 10	5	0.28	E=2694, L=4, S'=0.74 reported in 1972BaZP.
2770 10	2	1.08	
2873 10	5	0.72	
2919 10	(2)	0.25	Presumed to be same level as the E=2936, L=3·S'=0.072 state reported in 1972BaZP.
2991 10	4	2.24	
3044 10	4	0.28	
3077?@	0#	0.036#	

Continued on next page (footnotes at end of table)

$^{92}\text{Zr}(\text{d,p})$ 1973Bi04,1972BaZP (continued) ^{93}Zr Levels (continued)

<u>E(level)[†]</u>	<u>L[‡]</u>	<u>(2J+1)S[‡]</u>	<u>Comments</u>
3184 <i>IO</i>	2	0.068	Presumed to be the same level as the E=3146, L=2 level of 1972BaZP.
3215 <i>IO</i>	1 [#]	0.028 [#]	
3272 <i>IO</i>	2	0.088	
3322 <i>IO</i>	4	0.40	
3363? [@]	1 [#]	0.032 [#]	
3391 <i>IO</i>	2	0.68	
3421? [@]	3 [#]	0.37 [#]	
3486? [@]	1 [#]	0.020 [#]	
3576? [@]	3 [#]	0.064 [#]	
3649? [@]	1 [#]	0.024 [#]	
3697 <i>IO</i>	2	0.15	
3791 <i>IO</i>	(2)	0.44	E=3821, L=3, S'=0.27 from 1972BaZP.
3870 <i>IO</i>	5	0.38	
3910 <i>IO</i>	(2)	0.20	E=3915, L=3, S'=0.11 in 1972BaZP.
3966? [@]	3 [#]	0.13 [#]	
3989 <i>IO</i>	(2)	0.20	
4035 <i>IO</i>	4	0.88	
4061? [@]	3 [#]	0.23 [#]	
4118 <i>IO</i>	5	0.36	
4141? [@]	3 [#]	0.072 [#]	
4218? [@]			
4282? [@]	3 [#]	0.056 [#]	
4419 <i>IO</i>	3 [#]	0.064 [#]	Multiplet at E=4400 in 1963Co10.
4618? [@]			
4691 <i>IO</i>	3 [#]	0.064 [#]	
4785	1 [#]	0.016 [#]	E from 1972BaZP. Multiplet at E=4770 in 1963Co10.
4840? [@]	3 [#]	0.12 [#]	
4932 <i>IO</i>			Multiplet at E=5000 in 1963Co10.

[†] From 1973Bi04, unless indicated otherwise.

[‡] Based on comparison of $\sigma(\theta)$ with DWBA predictions; from 1973Bi04, unless noted otherwise.

[#] From 1972BaZP.

[@] From 1972BaZP only; the evaluator considers the existence of this level to be uncertain. ΔE is unstated, but E from 1972BaZP is within 15 keV of adopted values for E<2500.

[&] From 1972Fa05. Note that S' from 1972Fa05 is typically higher than S' from 1973Bi04 or 1972BaZP. ΔE is unstated, but E is typically within 6 keV of adopted value.