^{91}Zr(p,t) 2002Gu03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

J^π(^{91}Zr target)=5/2$^+$.

2002Gu03 (also 2000Gu20): E=25 MeV. Measured $\sigma(\theta)$ from 5° to 60° in 5° step using Q3D magnetic spectrometer and light-ion focal plane detector, an array of single-wire proportional counters followed by a plastic scintillator for particle identification through ΔE-E method. FWHM=8 keV. DWBA analysis and shell-model calculations using OXBASH code.

Others:

1972Bb03: E=31 MeV. Measured $\sigma(\theta)$, FWHM≈18 keV. 17 groups reported up to 2750 keV; L-values assigned to 14 groups, all in agreement with those from 2002Gu03.

1972Aw01 (also 1971Oh05): E=51.7 MeV. Measured $\sigma(\theta)$, FWHM=75 keV. L-values given for 10 of the 13 observed groups. 21 groups reported up to 3528 keV. See 1972Aw02 for theoretical description of (p,t) data analysis.

1971Ba43: E=38 MeV. Levels were reported at g.s., 588 (L=(3)), 1094, 1451, 1512, 1629 (L=(0)), 1742, 1834 (L=(0)) and 1867 . This paper is from the same group as 1972Bb03.

Enhancement factors were deduced by 1972Bb03 from ratio of experimental cross sections to those deduced from DWBA calculations.

^{89}Zr Levels

E(level)[†]	J^π[†]	L[†]	Integrated cross section (μb)[‡]	Comments
0	(7/2,9/2)$^+$	2+4+6[@]	309	J^π: 9/2$^+$ In Adopted Levels. Enhancement factor=1.1 (1972Bb03). Additional information 1.
588 *3*	(1/2 to 11/2)$^-$	3	75.4	J^π: 1/2$^-$ In Adopted Levels. Enhancement factor=1.0 (1972Bb03). Additional information 2.
1094 *3*	(3/2,5/2,7/2)$^-$	1+3[@]	94.9	J^π: 3/2$^-$ In Adopted Levels. Enhancement factor=0.45. Additional information 3.
1452 *3*	(5/2 to 15/2)$^-$	5	28.9	J^π: 5/2$^-$ In Adopted Levels. Additional information 4. L: other: 1+3+5 (1972Bb03). Enhancement factor=0.35.
1512 *3*	(7/2,9/2)$^+$	2+4+6[@]	17.0	J^π: (9/2)$^+$ In Adopted Levels. Enhancement factor=0.08.
1628 *3*	5/2$^+$	0	124	Enhancement factor=2.7. Additional information 5.
1745 *3*	(1/2 to 11/2)$^-$	3	11.3	J^π: 1/2$^-$ In Adopted Levels. Additional information 6. L: other: 1+3 (1972Bb03) suggests (3/2:7/2)$^-$, in disagreement with adopted J^π=1/2$^-$. Enhancement factor=0.09.
1832 *3*	5/2$^+$	0	156	Enhancement factor=3.4. Additional information 7.
1864 *3*	(3/2,5/2,7/2)$^-$	1+3[@]	31.9	J^π: 3/2$^-$ In Adopted Levels. Enhancement factor=0.14.
1941 *3*	(3/2 to 13/2)$^+$	4	2.57	J^π: (13/2)$^+$ In Adopted Levels.
2088 *3*	(1/2 to 9/2)$^+$	2	6.52	J^π: (5/2)$^+$ In Adopted Levels. L: others: 2+4+6 (1972Bb03) suggests (7/2,9/2)$^+$ in disagreement with adopted (5/2)$^+$, (2) (1972Aw01). Enhancement factor=0.09.
2101 *3*	(7/2,9/2)$^+$	2+4+6[@]	8.73	J^π: (7/2)$^+$ In Adopted Levels.

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^{91}Zr(p,t) 2002Gu03 (continued)

^{89}Zr Levels (continued)

E(level)[†]	J^{π}[†]	L[†]	Integrated cross section (μb)[‡]	Comments
2130[#] *3*		0+2[#]	21.3	E(level),L: doublet with 55% L=0 and 45% L=2 admixture. J^{π}: $5/2^+$ for one level and $(7/2,9/2)^+$ for the other In 'Adopted Levels'. Additional information 8.
2300 *3*	$(7/2,9/2)^+$	2+4+6[@]	2.06	J^{π}: $(7/2)^+$ In Adopted Levels.
2391 *3*	$(3/2$ to $13/2)^+$	4	1.35	J^{π}: $(5/2)^+$ In Adopted Levels.
2538 *3*	$(1/2$ to $9/2)^+$	2	8.41	Additional information 9. L: other: (3) (1972Bb03). Enhancement factor=0.14.
2563 *3*	$(1/2$ to $9/2)^+$	2	1.10	J^{π}: $(1/2{:}5/2)^+$ In Adopted Levels. Additional information 10.
2575 *3*	$(1/2$ to $9/2)^+$	2	2.38	J^{π}: $7/2^+,9/2^+$ In Adopted Levels. L: others: 1+3 (1972Bb03) in disagreement with L=2 (2002Gu03), and L=(2) (1972Aw01). Additional information 11. Enhancement factor=0.02.
2614 *3*	$(1/2$ to $9/2)^+$	2	17.7	J^{π}: $9/2^+$ In Adopted Levels. Additional information 12. Enhancement factor=0.35.
2713 *3*	$(7/2$ to $17/2)^+$	6	7.05	Additional information 13.
2732[#] *3*		0+3[#]	9.73	E(level),L: doublet with 10% L=0 and 90% L=3 admixture. J^{π}: $(5/2^+)$ for one level and $(7/2,9/2)^-$ for the other In Adopted Levels. Additional information 14.
2755 *3*	$(1/2$ to $9/2)^+$	2	57.7	J^{π}: $(7/2)^+$ In Adopted Levels. Additional information 15. Enhancement factor=1.2.
2783[#] *3*		2+5[#]	2.50	E(level),L: doublet with 10% L=2 and 90% L=5 admixture. J^{π}: $5/2^-,7/2^-$ for one level and $(5/2,7/2)^+$ for the other In 'Adopted Levels'.
2887 *3*	$(1/2$ to $9/2)^+$	2	3.57	J^{π}: $(7/2,9/2)^+$ In Adopted Levels.
2927 *3*	$(1/2$ to $11/2)^-$	3	5.39	
2958 *3*	$(1/2$ to $11/2)^-$	3	28.2	J^{π}: $(7/2)^-$ In Adopted Levels.
2996 *3*	$5/2^+$	0	47.9	L: other: L=0 for a 2961 group in 1972Aw01, most likely corresponds to 2996 group in 2002Gu03. Additional information 16.
3019 *3*	$(7/2,9/2)^+$	2+4+6[@]	6.05	
3090 *3*	$(1/2$ to $9/2)^+$	2	5.72	J^{π}: $(7/2)^+$ In Adopted Levels.
3144 *3*	$(1/2$ to $9/2)^+$	2	3.91	J^{π}: $9/2^+$ In Adopted Levels. Additional information 17.
3153 *3*	$(1/2$ to $9/2)^+$	2	11.3	
3181 *3*	$5/2^+$	0	14.3	
3269 *3*	$(1/2$ to $9/2)^+$	2	3.24	
3280 *3*	$5/2^+$	0	16.0	Additional information 18.
3339 *3*	$(1/2$ to $11/2)^-$	3	1.68	J^{π}: $1/2^-,3/2^-$ In Adopted Levels.
3372 *3*	$(1/2$ to $9/2)^+$	2	2.80	J^{π}: $9/2^+$ In Adopted Levels.
3420 *3*	$(1/2$ to $9/2)^+$	2	3.57	
3487 *3*	$(7/2,9/2)^+$	2+4+6[@]	3.64	
3513 *3*	$(7/2,9/2)^+$	2+4+6[@]	3.86	

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^{91}Zr(p,t) 2002Gu03 (continued)

^{89}Zr Levels (continued)

E(level)[†]	J^{π}[†]	L[†]	Integrated cross section (μb)[‡]	Comments
3535 *3*	(1/2 to 9/2)$^+$	2	7.72	J^{π}: (7/2$^+$,9/2$^+$) In Adopted Levels. Additional information 19.
3552 *3*	(7/2,9/2)$^+$	2+4+6[@]	9.74	
3597 *3*	(7/2,9/2)$^+$	2+4+6[@]	1.83	
3625 *3*	5/2$^+$	0	1.31	
3647 *3*	(1/2 to 9/2)$^+$	2	11.7	

[†] From 2002Gu03. Corresponding energies and L-values from 1972Bb03 and 1972Aw01 for about 20 groups up to 3 MeV excitation are in general agreement with those from 2002Gu03. Differences in L values are pointed out.

[‡] From 2002Gu03, uncertainty is 15%.

[#] Centroid energy of an unresolved doublet (2002Gu03); L-transfer is mixed.

[@] The $\sigma(\theta)$ distribution is featureless and can only be fitted by mixed L transfers.