^{90}Zr(d,^{3}He),(pol d,^{3}He) 1980St28,1968Pr02,1967Ka15

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

1980St28 (also 1984Se21): (pol d,^{3}He) E=52 MeV, FWHM≈200 keV, E-ΔE telescope. Measured $\sigma(\theta)$ and vector-analyzing power, DWBA analysis.
1968Pr02 (also 1966Pr06): (d,^{3}He) E=34.4 MeV, FWHM=75 keV, Si surface barrier detectors. Measured $\sigma(\theta)$, DWBA analysis.
1967Ka15: (d,^{3}He) E=21 MeV. Measured $\sigma(\theta)$ for 0, 906, 1510, 1750.
Others:
1962Cu07: (d,^{3}He) E=15 MeV.
1969Oh04: (d,^{3}He) E=23 MeV. Measured $\sigma(\theta)$ for 0 and 1510. Deduced J-dependence of $\sigma(\theta)$.
1977WuZR: (d,^{3}He) E=70 MeV. Measured $\sigma(\theta)$.
1987MaZI: (pol d,^{3}He) E=56 MeV. Measured $\sigma(\theta)$ and Ay(θ) for 0, 910, 1510 and 1750 states. Many other levels seen up to 8 MeV but the energies are not given.
Analysis of first four levels by 2001Kr01 shows that spectroscopic factors in (e,e′p) and (d,^{3}He) experiments are comparable.

^{89}Y Levels

E(level)[†]	J$^\pi$[‡]	L[#]	S[@]	Comments
0	1/2$^-$	1	1.8	S: 1.91 (1968Pr02). S=1.14 (1967Ka15). Reanalyzed S=0.60 (quoted by 2001Kr01 from a priv comm from one of the authors of 1980St28). 2p$_{1/2}$ state.
910	9/2$^+$	4	1.25	S: 1.10 (1968Pr02). S=0.51 (1967Ka15). Reanalyzed S=0.30 (quoted by 2001Kr01 from a priv comm from one of the authors of 1980St28). 1g$_{9/2}$ state.
1510	3/2$^-$	1	3.9	S: 4.25 (1968Pr02). S=2.2 (1967Ka15). Reanalyzed S=1.20 (quoted by 2001Kr01 from a priv comm from one of the authors of 1980St28). 2p$_{3/2}$ state.
1750	5/2$^-$	3	8.9	S: 7.80 (1968Pr02), S=2.0 (1967Ka15). Reanalyzed S=2.40 (quoted by 2001Kr01 from a priv comm from one of the authors of 1980St28). 1f$_{5/2}$ state.
2.×10^3[&]				
3.1×10^3[&]				
5.0×10^3		3	0.8	1f$_{5/2}$ or 1f$_{7/2}$ state.
6.8×10^3	7/2$^-$	3	2.1	1f$_{7/2}$ state.
7.3×10^3 *40*		3	9.2	L: giant resonance-like structure dominated by 1f7/2 transfer with some contribution from lower L values as suggested by small angle behavior of $\sigma(\theta)$ (1980St28).
15×10^3 *2*		(0)		E(level),L: a weak and wide structure consistent with L=(0) reported by 1984Se21 and tentatively interpreted as due to 2s$_{1/2}$ hole state.

[†] From 1980St28, unless otherwise stated. Energies below 1750 are also given by 1987MaZI, 1968Pr02 and 1967Ka15.
[‡] From DWBA analysis of $\sigma(\theta)$ and vector-analyzing power (1980St28).
[#] From 1980St28 based on DWBA analysis of $\sigma(\theta)$. For levels up to 1750, L values are also deduced by 1968Pr02 and 1967Ka15.
[@] C^{2}S from DWBA analysis of $\sigma(\theta)$ (1980St28). See also values from 1968Pr02 and 1967Ka15.
[&] From spectrum shown by 1984Se21.