^{38}Ar(d,p)   1972Se04

	Type	Author	History Citation	Literature Cutoff Date
	Full Evaluation	Jun Chen	NDS 149, 1 (2018)	1-Jan-2018

1972Se04: E=10.064 MeV deuteron beam was produced from the tandem accelerator at the University of Texas. Target was a gas cell of isotopically 96.8% enriched ^{38}Ar. Reaction products were detected with Si(Li) detectors (FWHM=35 keV). Measured $\sigma(E_p,\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data. Total of about 44 groups are reported including 14 neutron-unbound states.

1968Fi05: E=11.6 MeV deuteron beam was produced from the Heidelberg cyclotron. Target was ^{38}Ar gas (97.5% enriched). Reaction products were detected with ΔE-E counter telescopes (FWHM=90 keV) of surface-barrier counters and Si(Li) detectors. Measured $\sigma(E_p,\theta)$. Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Comparisons with available data. Total of about 8 levels up to 4380 are reported.

1967Ho02: E=11 MeV. Measured $\sigma(E_p,\theta)$ with a magnetic spectrograph (FWHM=20 keV). Deduced levels, J, π, L-transfers, spectroscopic factors from DWBA analysis. Five states up to 4380 are reported.

1973Co14: analysis of data from 1972Se04 for 11 neutron-unbound states from 6790 to 7730 using DWBA with complex energy form factors.

Other:

1978St16: E=4.40 MeV. Measured proton spectrum. Data are primarily on (d,pγ).

^{39}Ar Levels

Spectroscopic factor C^{2}S is obtained from (dσ/dΩ)(exp)=N×(2J+1)C^{2}S×(dσ/dΩ)(DWBA), where J is the spin of the final state in ^{39}Ar and N=normalization factor. N=1.65 is used in 1972Se04, N=1.58 used in 1968Fi05 and N=1.53 in 1967Ho02.

Cross sections given under comments correspond to maximum experimental values (1972Se04).

E(level)[†]	J$^{\pi}$[#]	L[†]	(2J+1)C^{2}S[@]	Comments
0		3	5.0	(2J+1)C^{2}S: 4.7 (1968Fi05), 3.5 (1967Ho02). dσ/dΩ=5.2 mb/sr.
1261[‡] 10	3/2$^-$	1	2.0	(2J+1)C^{2}S: 2.1 (1968Fi05), 1.9 (1967Ho02). dσ/dΩ=25.5 mb/sr.
1509 20		2	0.28[&]	(2J+1)C^{2}S: 0.25 (1968Fi05). dσ/dΩ=0.53 mb/sr.
2086 20		3	0.08,0.12	(2J+1)C^{2}S: 0.07 (1968Fi05) for L+1/2. dσ/dΩ=0.11 mb/sr.
2347 20		0	0.06	dσ/dΩ=0.35 mb/sr.
2423 20	1/2$^-$	1	0.08[&]	dσ/dΩ=1.20 mb/sr.
2477 20		3	0.48,0.54	(2J+1)C^{2}S: 0.67 (1968Fi05) for L+1/2. dσ/dΩ=0.67 mb/sr.
2629[‡] 10	3/2$^-$	1	0.72	(2J+1)C^{2}S: 0.70 (1968Fi05), 0.72 (1967Ho02). dσ/dΩ=10.9 mb/sr.
3053 20		3	0.16,0.18	dσ/dΩ=0.20 mb/sr.
3150 20		3	0.16,0.18	dσ/dΩ=0.19 mb/sr.
3258[‡] 10	1/2$^-$	1	0.86[&]	J$^{\pi}$: 1968Fi05 and 1972Se04 assign J=1/2 based on Lee-Schiffer effect, while on the basis of energy matching, this level is considered equivalent to the 3265.6 level in (α,nγ) where J=3/2 is assigned from $\gamma(\theta)$. (2J+1)C^{2}S: for J=1/2. Others: 0.95 (1968Fi05), 1.0 (1967Ho02).
3555 20				
3887 20		1,(2)	0.08,0.20	dσ/dΩ=0.87 mb/sr. (2J+1)C^{2}S: for L-1/2 for L=2.
4180 20	3/2$^-$	1	0.04	dσ/dΩ=0.89 mb/sr.
4250 20		3	0.08,0.12	dσ/dΩ=0.22 mb/sr.
4375[‡] 10	1/2$^-$	1	0.68[&]	(2J+1)C^{2}S: 0.70 (1968Fi05), 1.0 (1967Ho02). dσ/dΩ=2.07 mb/sr.

<u>^{38}Ar(d,p)</u>   <u>1972Se04</u> **(continued)**

^{39}Ar Levels (continued)

E(level)[†]	J$^\pi$[#]	L[†]	(2J+1)C^{2}S[@]	Comments
4916 20	3/2$^-$	1	0.08	dσ/dΩ=1.65 mb/sr.
4990 20	3/2$^-$	1	0.04	dσ/dΩ=0.88 mb/sr.
5149 20		3	0.16,0.18	dσ/dΩ=0.42 mb/sr.
5314? 20	(3/2)$^-$	1	0.04	dσ/dΩ=0.68 mb/sr.
5351 20				
5508 20		3	0.32,0.36	dσ/dΩ=0.93 mb/sr.
5652 20	3/2$^-$	1	0.08	dσ/dΩ=0.93 mb/sr.
5801 20	3/2$^-$	1	0.12	dσ/dΩ=1.77 mb/sr.
5925? 20	(3/2)$^-$	1	0.04	dσ/dΩ=0.68 mb/sr.
6057 20		3	0.40,0.54	dσ/dΩ=1.64 mb/sr.
6133 20	(3/2)$^-$	1	0.08	dσ/dΩ=1.13 mb/sr.
6278 20		3	0.40,0.54	dσ/dΩ=1.95 mb/sr.
6385 20		3	0.08,0.12	dσ/dΩ=0.39 mb/sr.
6488 20		3	0.24[&]	dσ/dΩ=0.64 mb/sr.
6688 20				
6759 20				
6789 20		1,3	0.36,0.72[&]	
6878 20				
6996 20		1,3	0.056,0.14[&]	
7062 20		1,3	0.034,0.13[&]	
7137 20		1,3	0.008,0.10[&]	
7222 20		3	0.14[&]	
7337 20		3	0.15[&]	
7401 20		3	0.11[&]	
7497 20		3	0.10[&]	
7560 20		3	0.066[&]	
7628 20		3	0.15[&]	
7727 20		3	0.17[&]	

[†] From 1972Se04, unless otherwise noted.

[‡] Weighted average of values from 1972Se04 and 1967Ho02.

[#] Assignments are made by 1972Se04 based on L=1 from $\sigma(\theta)$ and observed J-dependence (Lee-Schiffer effect).

[@] For L+1/2 transfer, unless otherwise noted. When two values are given, these are for L+1/2 and L-1/2 transfers, respectively. Quoted values are from 1972Se04 for levels below 6700 and from 1973Co14 for levels above that. Note that original values reported in 1972Se04 are for C^{2}S.

[&] For L-1/2 transfer (1973Co14).