^{36}Ar(d,t) 1970Wh04,2015Fr01

$J^\pi=0^+$ for ^{36}Ar ground state.

1970Wh04: a 21.0-MeV deuteron beam was produced at the Yale MP tandem Van de Graaff accelerator. The target was a ^{36}Ar gas cell. Tritons were detected using a 140−μm-530−μm thick ΔE-E telescope of silicon surface barrier detectors with FWHM=65-70 keV. Measured $\sigma(E_t,\theta)$. Deduced levels, L, and spectroscopic factors from JULIE-DWBA analysis of the measured $\sigma(\theta)$. Comparisons with shell-model calculations.

2015Fr01: E=22 MeV, 300-700 nA ^{2}H beams were produced at the Maier-Leibnitz Laboratorium (MLL) in Garching, Germany. The target was produced at the Center of Experimental Nuclear Physics and Astrophysics (CENPA) by implanting 3-6 μg/cm^2 of ^{36}Ar ions into 30 μg/cm^2 natural abundance carbon foils. Reaction products were momentum analyzed with a Q3D magnetic spectrograph. Measured E_t, $\sigma(E_t,\theta)$. Typical FWHM was ≈9 keV, and 16 keV in the 54° spectrum. Deduced levels, proton resonance energies, level densities. Comparisons with shell-model calculations. Relevance to ^{34g,m}Cl(p,γ)^{35}Ar thermonuclear reaction rates, but adequate information (about widths) is still lacking to obtain these rates.

^{35}Ar Levels

Spectroscopic factor $C^2S=\sigma(\theta)_{exp}/\sigma(\theta)_{DWBA}/N$, where N=3.33 is a normalization factor adopted by 1970Wh04 from 1966Ba54.

E(level)[†]	J^π	L	C^2S	Comments
0	$3/2^+$	2	3.4	
1180 *10*	$1/2^+$	0	1.4	
1700	$5/2^+$	(2)	<0.2	
2635 *20*	$3/2^+$	(2)	0.5	C^2S: for $J^\pi=3/2^+$. 1970Wh04 states that there is a large uncertainty in the spectroscopic strength. 1970Wh04 also gives S=0.11 or 0.032 assuming L=1, $J^\pi=3/2^-$.
2986 *20*	$5/2^+$	2	2.6	
3200 *20*	$7/2^-$	(3)	0.33,0.11	C^2S: assuming r_{0n}=1.25 F and V_n 60 MeV, respectively. 1970Wh04 states that there is a large uncertainty in the spectroscopic strength.

[†] From 1970Wh04 for low-lying states and from 2015Fr01 for resonances.