

$^1\text{H}(^{36}\text{Ar},\text{d})$ [2010Le03,2011Le01](#)

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

[2010Le03](#), [2011Le01](#): A ^{36}Ar beam at 33 MeV/u was provided at the National Superconducting Cyclotron Laboratory, MSU.

Targets were polyethylene $(\text{CH}_2)_n$. Deuterons were detected using the High-Resolution Array (HiRA) of Si and CsI(Tl) telescope detectors in coincidence with recoil residues identified in the S800 spectrometer by the focal plane ionization chamber andToF.

Measured $\sigma(E_d, \theta)$ in inverse kinematics. Deduced neutron spectroscopic factors from adiabatic distorted wave approximation (ADWA) analysis of the measured $\sigma(\theta)$ using Chapel-Hill global optical potential parameters (CH89) and JLM optical potentials and geometry for transferred neutron constrained by Hartree-Fock calculations (JLM+HF). Comparisons with shell-model calculated spectroscopic factors.

Theoretical studies involving $^1\text{H}(^{36}\text{Ar},\text{d})^{35}\text{Ar}$: [2011Nu01](#), [2023He15](#).

 ^{35}Ar Levels

| <u>E(level)</u> | <u>J^π</u> | <u>L^\ddagger</u> | <u>C^2S^\ddagger</u> | <u>Comments</u> |
|-------------------|---------------------------|--------------------------------|-----------------------------------|---|
| 0 | $3/2^+$ | 2 | 2.3 2 | <p>C^2S: other: 1.6 <i>I</i> from 2011Le01 ADWA (JLM+HF).</p> <p>C^2S: 2.29 23 (CH89) and 1.60 <i>I</i>6 (JLM+HF) from 2010Le03 ADWA.</p> <p>C^2S: 2.10 from large basis-shell model calculations (2010Le03).</p> <p>C^2S: 2.21 49 from a reanalysis of the $\sigma(\theta)$ data using finite-range ADWA (2011Nu01), including theoretical uncertainties associated with optical potentials (7%) and the approximate solution of three-body problems (19%).</p> <p>C^2S: 2.1 +2-4 from a reanalysis of the $\sigma(\theta)$ data using ADWA within a Bayesian framework (2023He15), including theoretical uncertainties associated with optical potentials.</p> |
| 1180 | | 0 | 1.2 <i>I</i> | |
| 2980 [†] | | | | |
| 3190 [†] | | | | |
| 5570 | | | | |

[†] Doublet in measured spectra.

[‡] From [2011Le01](#) ADWA (CH89).