^{1}H(^{37}Ca,t) 2023La09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Lijie Sun and Jun Chen	NDS 211,1 (2026)	30-Sep-2025

$J^{\pi}=3/2^{+}$ for ^{37}Ca ground state.

2023La09: A 50-MeV/nucleon ^{37}Ca secondary beam was produced via the fragmentation of a 95-MeV/nucleon $^{40}Ca^{20+}$ primary beam impinging on a ^{9}Be target, selected by the LISE3 spectrometer at GANIL, and then impinged on a liquid hydrogen cryogenic target (CRYPTA). Beam ions before target were tracked using two low-pressure multiwire proportional chambers (CATS). Heavy residuals after target were detected by a zero-degree detection system consisting of an ionization chamber, a set of two XY drift chambers, and a plastic scintillator. Tritons from 2n-transfer were detected using a set of six MUST2 DSSD-CsI telescopes in coincidence with the heavy residues of Ca or Ar. Measured $\sigma(E_t,\theta)$ in inverse kinematics. Deduced levels, J, π, L-transfers from FRESCO-DWBA analysis of measured $\sigma(\theta)$.

First measurement of ^{35}Ca mass excess: 4777 keV *105*.

First observation of excited states in ^{35}Ca.

Evidence of the magicity of N=16 close to the proton drip line.

Additional information 1.

^{35}Ca Levels

E(level)	J^{π}	L	Comments
0.0	$(1/2)^{+}$	2	J^{π}: mirror level: $1/2^{+}$ ^{35}P g.s. and shell model calculations. L: removal of one neutron from the $2s_{1/2}$ orbital and the other from the $1d_{3/2}$ orbital, leaving a single neutron in the $2s_{1/2}$ orbital.
2.24×10^{3} *33*	$3/2^{+}$	0	J^{π}: mirror level: $3/2^{+}$ ^{35}P first excited state at 2386.9 *11* and shell model calculations. L: removal of two neutrons from the $2s_{1/2}$ orbital, leaving a single neutron in the $1d_{3/2}$ orbital.