

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

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

2023La09: A 50-MeV/nucleon ^{37}Ca secondary beam was produced via the fragmentation of a 95-MeV/nucleon $^{40}\text{Ca}^{20+}$ primary beam impinging on a ^9Be 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 Ca or Ar. Measured $\sigma(E_t, \theta)$ in inversion kinematics. Deduced levels, J , π , L-transfers from FRESKO-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.

 ^{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.