

${}^1\text{H}({}^{36}\text{Mg}, {}^{36}\text{Mg}'\gamma)$ 2014Mi09

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	21-May-2021

Beam= ${}^{36}\text{Mg}$ at 44.5 MeV/nucleon, target=liquid hydrogen. Proton-proton inelastic scattering in inverse kinematics used to determine deformation length and β_2 for first 2^+ state.

2014Mi09: ${}^{36}\text{Mg}$ produced in fragmentation of 63 MeV/nucleon ${}^{48}\text{Ca}$ beam with ${}^{181}\text{Ta}$ and enriched ${}^{64}\text{Ni}$ target foils of 150 μm and 200 μm thicknesses, respectively at RFQ-RILAC-CSM-RRR accelerator at RIKEN facility. The fragments were separated and identified by RIPS fragment separator optimized for $A/Z=3$ reaction products. Particle identification was made from measurements of magnetic rigidity ($B\rho$), time-of-flight (TOF), and energy loss ($\Delta E-E$). The secondary beam of ${}^{36}\text{Mg}$ at 44.5 MeV/nucleon hit a liquid hydrogen target (CRYPTA). The scattered particles were analyzed by the TOMBEE spectrometer consisting of a superconducting triplet quadrupole, plastic scintillator, and a $\Delta E-E$ telescope of a silicon detector and a NaI(Tl) detector. Measured E_γ , I_γ , $\gamma\gamma$ -coin using DALI2 array of 160 NaI(Tl) detectors surrounding the hydrogen target. In order to apply Doppler correction to the measured γ -ray energies, angles of the γ rays were measured relative to the trajectories of the scattered particles. The scattering angles were measured using two parallel-plate avalanche counters (PPAC) upstream and one PPAC detector downstream from the ${}^1\text{H}$ target. Deduced deformation lengths and β_2 deformation parameter from the analysis of measured angle-integrated cross section by coupled-channel calculations with the ECIS97 computer code, and WP09 global potential. Comparison with shell-model (SDPF-M) calculations, and with previous experimental results.

 ${}^{36}\text{Mg}$ Levels

<u>E(level)</u>	<u>J^π</u>	<u>Comments</u>
0	0^+	
656 13	2^+	Excitation $\sigma=47$ mb 8 (2014Mi09) for the first 2^+ state. The measured cross section accounts for γ rays observed in ${}^{35}\text{Mg}$, which modifies σ for 2^+ state in ${}^{36}\text{Mg}$ by 2%. Total excitation $\sigma=49$ mb 8 (2014Mi09) including feeding from higher state. Feeding from higher states is estimated as 2 mb 5. Deformation length $\delta=1.90$ fm +16-17(stat) 16(syst) (2014Mi09). $\beta_2=0.50$ +4-5(stat) 4(syst) (2014Mi09).

 $\gamma({}^{36}\text{Mg})$

<u>E_γ</u>	<u>$E_i(\text{level})$</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Comments</u>
656 13	656	2^+	0	0^+	E_γ : 656 +15-11 in 2014Mi09.

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Level Scheme

