

SAIP2016



DEPARTMENT OF ASTRONOMY

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA · UNIVERSITEIT VAN KAAPSTAD



Contribution ID : 179

Disentangling second-order effects in Coulomb Excitation Theory: (Reorientation and Nuclear Polarizability Effects)

Tuesday 05 Jul 2016 at 16:10 (01h50')

Abstract :

We aim at disentangling the second order-effects in Coulomb Excitation (Reorientation Effect and Nuclear Polarizability). A safe coulomb excitation experiment was performed to study the nuclear polarizability and reorientation effects through measuring the spectroscopic quadrupole moment Q_s for the first 2_1^+ in ^{40}Ar . A beam of $^{40}\text{Ar}^{6+}$ at 134 MeV with typical currents of ≈ 0.5 to 1 nA was provided by the Cyclotron accelerator facility at iThemba Labs, which was Coulomb excited on a $\approx 1 \text{ mg/cm}^2$ ^{194}Pt target. A double sided CD-type S3 silicon detector was used to detect particles at forward angles in coincidence with γ -rays. The deexcited γ -rays from the residual nuclei were detected using the AFRODITE array (5 clover detectors at 90° and 3 at 135°). A semi-classical couple channel Coulomb Excitation code, GOSIA, will be utilized to extract the matrix element for the $Q_s(2^+)$ from the experimental data.

Award :

Yes

Level :

MSc

Supervisor :

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Paper :

No

Permission :

Yes

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Session classification : Poster Session (1)

Track classification : Track B - Nuclear, Particle and Radiation Physics

Type : Poster Presentation