



Contribution ID: 126

Type: Oral Presentation

INVESTIGATING THE PHOTON STRENGTH FUNCTION FOR ^{61}Cu USING $^{60}\text{Ni}(p, \gamma)$ REACTION AT iTHEMBA LABS

Thursday 10 July 2025 10:50 (20 minutes)

INVESTIGATING THE PHOTON STRENGTH FUNCTION FOR ^{61}Cu USING $^{60}\text{Ni}(p, \gamma)$ REACTION AT iTHEMBA LABS

The Brink-Axel hypothesis assumes that photo-de-excitation only depends on the emitted γ -ray energy E_γ and not the detailed structure of the initial and final states (spin and parity) involved in the transition as it is the case for photo-excitation process. While the hypothesis is widely used for all PSF energy regions such as the giant dipole resonance (GDR), it remains under investigation for the low energy region [1]. In the present work, this hypothesis will be tested below the neutron separation energy, using for the first time radiative proton capture. An experiment to indirectly measure the photon strength function (PSF) took place at iThemba LABS's Tandemtron facility, to populate excited states in ^{61}Cu utilizing $^{60}\text{Ni}(p, \gamma)^{61}\text{Cu}$ reaction. The model independent ratio method [2] and the shape method [3] will be used to investigate the statistical γ -ray decay to individual well established discrete states. With the neutron separation energy at 11.7 MeV, populated states with beam energies in the range 2.32-4.32 MeV will confine the study below the particle separation energy.

Data analysis is ongoing, and preliminary results will be presented.

References

1. S. Goriely et al., Eur. Phys. J. A 55, 172 (2019).
2. M. Wiedeking et al. Phys. Rev. Lett. 108, 162503 (2012).
3. M. Wiedeking et al. Phys. Rev.C 104, 014311 (2021).

This research work is supported in part by the National Research Foundation (Grant No:118846, 92600, 90741, 92789 and REPSARC180529336567). It is also based upon work supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under Contract No. DE-AC02-05CH11231.

Apply for student award at which level:

PhD

Consent on use of personal information: Abstract Submission

Yes, I ACCEPT

Primary authors: Mr NETSHIYA, Adivhaho A (iThemba LABS, University of Witwatersrand, Walter Sisulu University, South Africa); Dr BAHINI, Armand (iThemba LABS); Prof. OGUNDARE, Folurunso (UNIVERSITY OF BOTSWANA); BEKKER, Jacob (University of the Witwatersrand, iThemba LABS, South Africa); Dr MALATJI,

Kgashane Leroy (University of California, Berkeley, California, USA); Mr JAFTA, Lesedi (Physics Department, University of the Western Cape, Bellville, South Africa); Dr DONALDSON, Lindsay Michelle (iThemba LABS); PELLE-GRI, Luna (University of the Witwatersrand and iThemba LABS); Prof. WIEDEKING, Mathis (Lawrence Berkeley National Laboratory, Berkeley, California, USA); Dr PALALANI, Nyaladzi (UNIVERSITY OF BOTSWANA); JONES, Pete (iThemba LABS); Dr ADSLEY, Philip (Department of Physics and Astronomy, Texas A&M University, College Station, Texas, USA); Ms MOLAENG, Refilwe Emily (School of Physics, University of the Witwatersrand, Johannesburg, South Africa); NEVELING, Retief (iThemba LABS); Dr JONGILE, Sandile (iThemba LABS); Ms MAGAGULA, Sebenzile P.E (iThemba LABS, School of Physics, University of the Witwatersrand, Johannesburg, South Africa); HART, Shanyn (University of Cape Town and iThemba LABS); Mr BINDA, Sifundo D (School of Physics, University of the Witwatersrand, Johannesburg, South Africa); Dr KHUMALO, Thuthukile (NRF-iThemba LABS); Mr MODISE, Tshegofatso Goitseone (UNIVERSITY OF BOTSWANA); Dr KHESWA, Vincent. B (iThemba LABS, Department of Applied Physics and Engineering Mathematics, University of Johannesburg, South Africa)

Presenter: Mr MODISE, Tshegofatso Goitseone (UNIVERSITY OF BOTSWANA)

Session Classification: Nuclear, Particle and Radiation Physics-1

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