



Contribution ID: 305

Type: Oral

Photon Strength Function studies at iThemba LABS

Wednesday, 29 November 2023 12:45 (15 minutes)

The study of nuclear statistical properties is of importance not only in nuclear waste transmutation [1] and nuclear fuel cycles [2] but also in nuclear structure and nuclear astrophysics studies [3]. These statistical properties - the nuclear level density (NLD), which describes the number of available energy levels in a nucleus for a given excitation energy, and the photon strength function (γ SF), which is the electromagnetic decay probability for a nucleus to either emit or absorb a gamma-ray, are critical ingredients into calculations of radiative neutron capture cross sections, which are in turn, used to constrain nucleosynthesis processes.

In this presentation, measurements of nuclear level densities and photon strength functions performed at iThemba LABS and their applications will be discussed. I will also introduce the newly built low-energy nuclear physics beamline at iThemba LABS' Tandatron facility, which is capable of holding 9 HPGe detectors, covering an angular range of 26-141 degrees.

[1] N. Colonna et al., Energy Environ. Sci. 3, (2010) 1910.

[2] Report of the Nuclear Physics and Related Computational Science R&D for Advanced Fuel Cycles Workshop, DOE Offices of Nuclear Physics and Advanced Scientific Computing Research (2006).

[3] M. Arnould and S. Goriely, Phys. Rep. 384 (2003) 1-84.

This work is based on the research supported by the National Research Foundation of South Africa Grant Number 133636 and 118846

Attendance Type

In-person

Primary authors: Mr NETSHIYA, Adivhaho (iThemba LABS, WITS); Dr BAHINI, Armand (University of the Witwatersrand, Johannesburg); Dr KHESWA, Bonginkosi (University of Johannesburg); Mr BEKKER, Jacob (University of the Witwatersrand); MALATJI, Kgashane (iThemba LABS); Dr DONALDSON, Lindsay (iThemba Laboratory for Accelerator Based Sciences); Dr PELLEGGRI, Luna (University of the Witwatersrand and iThemba LABS); Prof. WIEDEKING, Mathis (University of the Witwatersrand and iThemba LABS); Dr JONES, Pete (iThemba LABS); Prof. ADSLEY, Phillip (Department of Physics and Astronomy, Texas AM University, Texas, USA.); Ms MOLAENG, Refilwe (iThemba LABS); Dr NEVELING, Retief (iThemba LABS); Dr JONGILE, Sandile (iThemba LABS); Ms MAGAGULA, Sebenzile Pretty Engelinah (iThemba Labs and University of the Witwatersrand); Ms HART, Shanyn-Dee (University of the Witwatersrand); Mr BINDA, Sifundo (iThemba LABS and Wits University); Ms THUMALO, Thuthukile (iThemba LABS)

Presenter: MALATJI, Kgashane (iThemba LABS)

Session Classification: Session 2

Track Classification: Nuclear Structure, Reactions and Dynamics