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Photon Strength Function studies at iThemba LABS

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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.

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Attendance Type

In-person

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