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Studies of the low lying E1 “Pygmy resonance” modes in ¹⁵⁴Sm using inelastic alpha scattering

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In this study, the low-lying electric dipole (E1) response referred to as the Pygmy Dipole Resonance (PDR) is investigated using the (alpha;,alpha;'gamma;) inelastic scattering reaction at 120 MeV on the deformed ¹⁵⁴Sm nucleus. Coincidence experiments were performed at the iThemba LABS using the K600 magnetic spectrometer in 0deg; mode and BaGeL (Ball of Germanium and LaBr detectors), an array of High-Purity Germanium (HPGe) and Lanthanum Bromide detectors. The use of an alpha probe enabled the isoscalar character of the PDR to be investigated, whilst the alpha;-&gamma coincidence allowed for the selection of specific decay channels.
The study is motivated by the need to further understand the underlying nature of the PDR. The PDR has been interpreted as an oscillation of the neutron excess against a proton-neutron saturated core. Its strength has been linked to the neutron skin by several theoretical approaches, providing possible constraints on the nuclear equation of state. These constraints play a vital role in the description of neutron stars. In addition, the PDR has an influence on reaction rates in the astrophysical r-process. In this talk, preliminary results will be presented and the methods employed for data extraction discussed.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD, N/A)?

PhD

Main supervisor (name and email)
and his / her institution

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Would you like to <br> submit a short paper <br> for the Conference
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Yes

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