ID de Contribution: **44** Type: **Poster**

Study of Pygmy Dipole Resonance using neutron inelastic scattering at GANIL-SPIRAL2/NFS : Status of the analysis

Giant dipole resonance is a collective excitation mode of the nucleus that exhaust most of the dipole excitation strength. But additionnal low lying dipole strength has been observed in neutron-rich nuclei, called the Pygmy Dipole Resonance (PDR). Both experimental and theoretical studies [1,2,3] have been performed on the PDR, which is often described as the oscillation of a neutron skin against a symmetrical neutron-proton core.
The study of the PDR is interesting in many ways: it allows to constrain the symmetry energy (a term in the nuclear equation of state that drives the neutron skin and the description of nuclear matter in neutron stars) [4], and predictions show that this mode can play a key role in the astrophysical r-process [5]. However no coherent description on the nature of the PDR has been achieved yet.

In this context, the study of the PDR using a new probe, the neutron inelastic scattering reaction (n;n'γ), has been proposed. The high-intensity proton beam of the SPIRAL2 accelerator at GANIL [6], and the NFS (Neutron For Science) facility [7] have made this study possible. The experiment to study the PDR in 140Ce via the (n;n'γ) reaction was performed in Sept 2022. The new generation multi-detector PARIS [8] has been used for the detection of the γ from the deexcitation of the PDR, and MONSTER modules [9] were set for the scattered neutrons detection.

The characterization of the PARIS and MONSTER detectors and results on the elastic scattering will be presented, as well as preliminary results on the (n;n'γ) channel.

[1] D. Savran, T. Aumann, A. Zilges, Prog. Part. Nucl. Phys. 70, 210-245 (2013)
[2] A. Bracco, E.G. Lanza, A. Tamii, Prog. Part. Nucl. Phys. 106, 360-433 (2019)
[3] E. G. Lanza, L. Pellegri, A. Vitturi, M. V. Andrés, Prog. Part. Nucl. Phys. 129, 104006 (2023)
[4] A. Carbone et al., Phys. Rev. C 81, 041301(R) (2010)
[5] S. Goriely, E. Khan, M. Samyn, Nucl. Phys. A 739, 331-352 (2004)
[6] A. K. Orduz et al., Phys. Rev. Accel. Beams, 25 (2022)
[7] X. Ledoux et al., Eur. Phys. J. A, 57 (2021)
[8] A. Maj et al., Acta Phys. Pol. B40, 565 (2009)
[9] A. R. Garcia et al., JINST 7, C05012 (2012)

Auteurs principaux: VANDEBROUCK, Marine (CEA Saclay DPhN); MIRIOT-JAUBERT, Périne (CEA Saclay / IRFU / DPhN)

Orateur: MIRIOT-JAUBERT, Périne (CEA Saclay / IRFU / DPhN)

Classification de Session: Short presentations