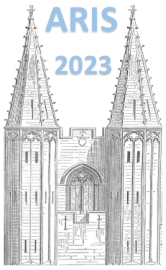

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Study of the Pygmy Dipole Resonance using neutron inelastic scattering at GANIL-SPIRAL2/NFS

mardi 6 juin 2023 09:35 (25 minutes)

The pygmy dipole resonance (PDR) is a vibrational mode described as the oscillation of a neutron skin against a core symmetric in number of protons and neutrons. The PDR has been the subject of many studies, both experimental and theoretical [1,2]. Indeed, the study of the PDR has been and still is of great interest since it allows to constrain the symmetry energy, an important ingredient of the equation of state of nuclear matter that describes the matter within neutron stars [3]. Moreover, the PDR is predicted to play a key role in the r-process via the increase of the neutron capture rate [4]. However, despite numerous experiments dedicated to the study of the PDR, a consistent description could not be extracted. In this context, we propose to study the PDR using a new probe: the neutron inelastic scattering reaction (n,n'g).

An experiment to study the pygmy resonance in 140Ce using the (n,n'g) reaction has just been carried out. This experiment has been made possible thanks to the high-intensity proton beam of the new accelerator SPIRAL2 at GANIL and the NFS (Neutron For Science) facility. The experimental setup consisting of the new generation multi-detectors PARIS [5], for the detection of gammas coming from the de-excitation of the PDR, and MONSTER [6], for the detection of scattered neutrons, was used.

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