

CENTRE D'ETUDES NUCLÉAIRES DE BORDEAUX-GRADIGNAN

Vendredi 24 Octobre 2014

à

11H00

Un café sera servi à partir de 10h45

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Particle-core couplings close to neutron-rich doubly-magic nuclei: recent results from the EXILL campaign

The coupling between valence particles and core excitations is a very important issue in nuclear structure studies, being a key process at the origin of the quenching of spectroscopic factors, the anharmonicities of vibrational spectra and the damping mechanisms of giant resonances. The investigation of this coupling by using a systematic gamma spectroscopy study of nuclei lying close to the neutron-rich doubly-magic ^{48}Ca , ^{132}Sn and ^{208}Pb cores is of special interest as the phonon excitations are expected to significantly influence the single particle structure in these species. Recent results obtained by cold neutron capture (n,γ) and neutron induced fission on ^{235}U and ^{241}Pu targets will be presented. The measurements were performed at ILL (Grenoble), using the EXOGAM HpGe array in two configurations: standalone and coupled to fast LaBr₃ scintillator detectors for lifetime measurements by fast timing techniques. The focus is, in particular, on experimental data on $^{47,49}\text{Ca}$, ^{133}Sb and ^{210}Bi , which can be compared with theoretical calculations either based on a particle-phonon coupling approach or on a shell model employing realistic effective nucleon-nucleon interactions. Results on $^{61,65,67}\text{Cu}$ [1,2], obtained at NIPNE (Bucharest), will also be briefly discussed in terms of couplings with the 3- octupole phonon of the semi-magic $^{60,64,66}\text{Ni}$ cores.

From a broader perspective, the presented data will be used to assess the robustness of the nuclear shell closures in various regions of the nuclear chart, from rather light to heavy systems. They will also serve as a testing ground for state of the art theoretical models.

[1] G. Bocchi et al., *Phys. Rev. C* 89, 054302 (2014)

[2] C. Nita et al., *Phys. Rev. C* 89, 064314 (2014)

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