

Small resonances on the tail of the Giant Dipole Resonance

The nuclear physics group at the Oslo Cyclotron Laboratory has developed a unique technique to extract simultaneously the level density and γ -strength function from primary γ -ray spectra [1]. These are fundamental properties of the atomic nucleus and important input parameters in reaction cross-section calculations, used in reactor physics simulations and astrophysics models of formation of heavy elements in explosive stellar environments. I will give a short description of our facility and the Oslo method. Then the latest result from experiments done in Oslo will be presented, including recent data on actinide nuclei, relevant for the Thorium fuel cycle, where we observe a large orbital scissors strength for several actinide nuclei [2]. We have also observed another resonance around 7-9 MeV in Sn isotopes which might be due to neutron skin oscillations [3]. Both these resonances increase the gamma decay probability and should be included in neutron capture cross-sections calculations. Finally an unexpected enhancement of the γ -strength function at low gamma energy has been observed in several nuclei [4]. This low energy enhancement has the potential of increasing neutron-capture rates with up to two orders of magnitude if also present in very neutron-rich nuclei [5]. The present status of the low-energy enhancement will be presented.

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[4] A. Voinov et al., Phys. Rev. Lett 93, 142504 (2004); M. Guttormsen et al., Phys. Rev. C 71, 044307 (2005);

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