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Exotic structures in the nuclear dipole spectrum

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Electric-dipole resonances in nuclei, and in particular exotic nuclei, have been linked theoretically to important phenomena on vastly different scales: they facilitate nucleosynthesis processes, especially when they lie close to the particle emission threshold; and through their properties we hope to learn about neutron skins and the nuclear symmetry energy, a key factor in the evolution of neutron stars.

I plan to discuss recent progress and new opportunities in understanding the richness of the dipole excitation spectrum, based on microscopic calculations and how they compare with existing data on stable and exotic nuclei [1-3]. I will focus on the influence of shell structure and of loosely bound orbitals on low-energy transition strength, particularly relevant near the drip lines [1,2]. I will take the opportunity to briefly present theoretical advances based on realistic two- and three-nucleon interactions [4,5].

[1] P.Papakonstantinou et al., Phys. Lett. B 709 (2012) 270; Phys. Rev. C 89 (2014) 034306; Phys. Rev. C 92 (2015) 034311

[2] Y.Kim and P.Papakonstantinou, Eur. Phys. J. A 52 (2016) 176

[3] V.Derya et al., Phys. Lett. B 730 (2014) 288

[4] P.Papakonstantinou and R.Roth, Phys. Lett. B 671 (2009) 356

[5] P.Papakonstantinou, R.Trippel, R.Roth, Acta Phys. Pol. B 48 (2017) 527

Related to topics : Theoretical nuclear physics for astrophysics ; next generation RI beam facilities ; nuclear matter and neutron stars

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