Université Paris-Saclay
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Séminaire de Physique Nucléaire Théorique

Universal or not ? EFT insights into reactions on two-neutron halos and ^{6}Li

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Few-body universality connects the properties of systems that are governed by interactions which generate large s-wave scattering lengths, a_0. In the first part of this talk I will argue that several two-neutron halo nuclei could display aspects of few-body universality. In particular, I will show calculations of the two-neutron energy spectrum that is produced after rapid removal of the core from several exotic nuclei. After appropriate rescaling the resulting spectra are described by single curve, a result that is due to the proximity of the neutron-neutron and core-neutron interactions to the unitary limit $|a_0| \to \infty$. In the second part of the talk I will discuss ab initio results for ^{6}Li that were obtained using the No-Core Shell Model with Continuum (NCSMC). The NCSMC calculations show a strong correlation between the deuteron separation energy in ^{6}Li and the Asymptotic Normalization Coefficient of the alpha-deuteron component of its wave function. I will argue that this correlation is not a universal one, but that it is due to a factorization of long-distance and short-distance physics in ^{6}Li, and that this factorization can be exploited to make ab initio calculations of that system more efficient.

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