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Séminaire de Physique Nucléaire Théorique

Single- and double-Λ hypernuclei in pionless EFT

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The extension of nuclear physics to the strange sector is a difficult challenge due to the shortage of experimental data, and the difficulty in solving QCD at low energies. With the forthcoming new facilities and new experiments dedicated to the study of single- and double-lambda hypernuclei we prospect new and important developments in this field in the very near future. Reliable theories are essential to support and analyze these experimental campaigns. In this talk, we present the first comprehensive application of pionless effective field theory to single and double Λ hypernuclei composed of up to 6 baryons. The theory, fitted to reproduce available experimental data, solves the longstanding overbinding problem of the $^{5}_{\Lambda}$He hypernucleus and predicts the existence of a five-body double-Λ Hypernuclear bound state yet to be found. Pionless effective field theory is revealed to be a very successful approach to hypernuclei due to the small number of free parameters, and the good theoretical accuracy, enhanced by the large breaking scale and the small momentum of the lambda particles.

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