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The hyperon-nucleon interaction in low-energy effective field theory

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In recent years, there has been a notable interest in investigating hypernuclear systems, which provide a unique laboratory for studying strong interactions in the strange quark sector. One of the main applications is related to the so-called "hyperon puzzle" in neutron stars, where theoretical models including hyperons predict maximum masses of $\sim 1.5\, M_\odot$ or less, in conflict with observations of neutron stars with masses up to $\sim 2\, M_\odot$.
Solving this puzzle with nuclear physics tools requires a detailed understanding of hyperon-nucleon (YN) interactions, hyperon-hyperon (YY) interactions, and three-body interactions involving hyperons and nucleons. In this talk, I will present the development of a local potential model for the ΛN interaction, derived using a low-energy EFT formalism that involves contact terms only. The present interaction has been derived up to next-to-leading order (NLO). I will also discuss the details of the fitting procedure to Λp elastic scattering cross sections and present our results for different cutoff parameters up to 2.5 fm.

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