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Strangeness S=-3 and -4 baryon-baryon interactions in chiral effective field theory

The Jülich-Bonn-Munich Collaboration has applied chiral effective field theory to investigate the baryon-baryon interaction involving hyperons. These studies, performed so far up to next-to-leading order (NLO) in the chiral expansion, have shown that for the strangeness $S = -1$ (ΛN, ΣN) and $S = -2$ ($\Lambda\Lambda$, ΞN) sectors a consistent and satisfactory description of the available scattering data and experimental constraints can be achieved within the assumption of broken SU(3) flavor symmetry. In addition, applications of the resulting potentials in bound-state calculations for light hypernuclei led to results close to the empirical values.

In the present contribution we discuss a possible extension of this approach to strangeness $S = -3$ and $S = -4$ baryon-baryon systems where empirical information is rather scarce. Specifically we address the question in how far measurements of two-body correlation functions in heavy-ion collisions and/or in high energetic proton-proton scattering can be used to pin down the interaction in channels like $\Xi\Lambda$ or $\Xi\Xi$, at least on a semi-quantitative level.

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