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Recent progress in the construction of covariant chiral nuclear forces

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Over the past twenty years, one has seen remarkable progress in *ab initio* studies of nuclear structure and reactions with chiral nuclear forces. In a series of recent studies [1-5], we have shown that it is possible to construct chiral nuclear forces using covariant baryon chiral perturbation theory, which enjoy a number of appealing features. For instance, they are manifestly covariant and therefore can be applied in *ab initio* studies based on covariant frameworks, such as the Dirac-Brueckner Hartree-Fock approach. Second, they converge relatively faster than their non-relativistic counterparts both in the two-body [1-5] and in the three-body sector [6]. In this talk, we explain in detail how they are built from covariant baryon chiral perturbation theory [1,2], highlight their applications to lattice QCD simulations in the hyperon-nucleon/hyperon sector [3,4], and show the recent progress in going to higher chiral orders in this endeavor [5,7].

References:

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