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Large-Nc scalings in Chiral Effective Field Theory of the Contact Interactions for Octet and Decuplet baryons

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Starting from the relativistic manner, in this work, we construct the non-derivative four-point interactions for Octet and Decuplet baryons in the Chiral Effective Field Theory (ChEFT). The non-relativistic expansion of the baryon fields has been considered up to the Next-Leading Order (NLO) of the three-momentum. Using the $1/N_c$ operator product expansion up to $1/N_c^2$, we can reduce the free parameters (coupling constants) of the ChEFT from 28 down to 13. Moreover, we will discuss the implications of the large-Nc scalings in ΩΩ and ΩN scatterings from the Lattice QCD data.

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