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NLO and NNLO Low Energy Constants for SU(2) Chiral Perturbation Theory

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We have performed global fits of f_π and m_π, from a variety of RBC-UKQCD domain wall fermion ensembles, to $SU(2)$ partially quenched chiral perturbation theory at NNLO. We report values for 9 NLO and 8 linearly independent combinations of NNLO partially quenched low energy constants, which we compare to other lattice and phenomenological determinations. We discuss the convergence of the expansion and use our large set of low energy constants to make predictions for the pion mass splitting due to QCD isospin breaking effects and the S-wave $\pi\pi$ scattering lengths. Finally, we discuss the effects of including lattice results for the $I = 2$ $\pi\pi$ scattering length in our chiral fits.

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