SEMINARIO
Departamentos de Física Teórica I y II
Universidad Complutense de Madrid

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TITULO: Nucleon-Nucleon scattering from the dispersive N/D method: Next-to-leading study

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ABSTRACT

We consider nucleon-nucleon (NN) interactions from Chiral Effective Field Theory applying the N/D method. We calculate the discontinuity of the NN partial-wave amplitudes across the left-hand cut (LHC) by including one-pion exchange (OPE), once-iterated OPE and leading irreducible two-pion exchange (TPE) calculated in Chiral Perturbation Theory (ChPT). We discuss both uncoupled and coupled partial-waves. Phase shifts and mixing angles are typically quite well reproduced, and a clear improvement of the results obtained previously with only OPE is manifest. We also show that the contributions to the discontinuity across the LHC are amenable to a chiral expansion. In addition, the typical size in these contributions of once-iterated OPE and irreducible TPE is similar, and both of them are booked as {\cal O}(p^2) in the chiral counting, which is the proper order of leading irreducible TPE. We are also able to predict the 1S0 effective range, once the 1S0 scattering length is fixed without any other experimental input, with a deviation of only -0.1 fm compared to its experimental value.