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

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TITULO: Nucleon-nucleon scattering from dispersion theory: NLO results

LUGAR: FACULTAD DE CIENCIAS FÍSICAS UCM
DÍA: 18 de octubre, 2013 (Viernes)
HORA: 14:30
AULA: Seminario Depto. Física Teórica I, Planta 3ª

ABSTRACT

We consider nucleon-nucleon (NN) interactions from Chiral Effective Field Theory applying the N/D method. This method requires as dynamical input the discontinuity of a NN partial-wave amplitude across the left-hand cut (LHC). We show that one has a unique solution of the integral equation when the aforementioned discontinuity is given by one-pion exchange (OPE). Necessary conditions are given for having a solution when including the next-to-leading contributions from Chiral Perturbation Theory, namely, once-iterated OPE and leading irreducible two-pion exchange (TPE). We discuss the chiral order of the subtraction constants included in the dispersion relations as well.

Next, we present our results both for uncoupled and coupled partial-waves. Phase shifts and mixing angles are typically rather well reproduced, and a clear
improvement of the results obtained previously with only OPE is manifest. Our method also establishes correlations between the S-wave effective ranges and scattering lengths based on unitarity,analyticity and chiral symmetry.