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Two-nucleon scattering in multiple partial waves

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We determine scattering phase shifts for s,p,d, and f partial wave channels in two-nucleon systems using lattice QCD methods. We use a generalization of Luscher's finite volume method to determine infinite volume phase shifts from a set of finite volume ground- and excited-state energy levels on two volumes, V=(3.4 fm)^3 and V=(4.5 fm)^3. The calculations are performed in the SU(3)-flavor limit, corresponding to a pion mass of approximately 800 MeV. From the energy dependence of the phase shifts we are able to extract scattering parameters corresponding to an effective range expansion.

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