

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Atom-dimer and dimer-dimer scattering in fermionic mixtures near a narrow Feshbach resonance JESPER LEVINSEN, University of Cambridge, DMITRY PETROV, LPTMS, Universite Paris-Sud XI, France — We develop a diagrammatic approach for solving few-body problems in heteronuclear fermionic mixtures near a narrow interspecies Feshbach resonance. We calculate s-, p-, and d-wave phaseshifts for the scattering of an atom by a weakly-bound dimer. The fermionic statistics of atoms and the composite nature of the dimer lead to a strong angular momentum dependence of the atom-dimer interaction, which manifests itself in a peculiar interference of the scattered s- and p-waves. This effect strengthens with the mass ratio and is remarkably pronounced in 40K-(40K-6Li) atom-dimer collisions. We discuss the collisional relaxation of the dimers to deeply bound states and evaluate the corresponding rate constant as a function of the detuning and collision energy. Finally, we calculate the scattering length for two dimers formed near a narrow interspecies resonance.

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Date submitted: 18 Nov 2010

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