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Opposite-spin Fermion pairs in the strongly-interacting regime¹ JAVIER VON STECHER, CHRIS H. GREENE, Department of Physics and JILA, University of Colorado, Boulder, Colorado 80309-0440 — We propose a new method to study pair formation in the BCS-BEC crossover regime. The method considers a pair of opposite spin fermions that interact with a degenerate Fermi gas trapped in a spherical oscillator potential. In the vicinity of a Feshbach resonance, we magnetically vary the S-wave scattering length in the negative region. This produces an attractive interaction between fermions which is not strong enough to bind them. We construct an antisymmetric wavefunction formed by the spin-orbitals of the Fermi gas and a pair function of opposite spin fermions. We study variationally the ground state energy of the composite system of this pair in the presence of a degenerate Fermi gas, as a function of the magnetic field. In particular, we consider the region close to the collapse of the Fermi gas, in the strongly interacting regime.

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