Application of the stochastic variational approach to few-fermion systems

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This talk summarizes our theoretical investigations of universal aspects of ultracold fermionic gaseous few-atom systems. In the ultracold regime, where the deBroglie wave length is large compared to the range of the atom-atom interaction potentials, the collisions between atoms become so slow that the details of the interactions are, to leading order, negligible. In this regime, the dynamics of few-atom systems is governed by just one or two “effective parameters” such as the s-wave scattering length. We investigate the behavior of strongly-interacting two-component Fermi gases with equal and unequal masses using the stochastic variational approach, a basis set type expansion approach, that is frequently used in nuclear physics and in atomic and molecular structure calculations.

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