

Abstract Submitted  
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**Properties and dynamics of four particles in a trap in the BCS-BEC crossover.**<sup>1</sup> JAVIER VON STECHER, CHRIS H. GREENE, JILA and Department of Physics, University of Colorado, Boulder, Colorado 80309-0440 — The Hamiltonian of two spin up and two spin down fermions in a trap is calculated using a correlated gaussian basis in the vicinity of the BCS-BEC crossover. From the spectrum, key properties of the few-body system are deduced as a function of the 2-body scattering length. After a diabaticization procedure, the wavefunctions are used to evolve in time an initial configuration, mimicking molecule formation experiments with Fermi gases in the BCS-BEC crossover. The dynamics are successfully modeled as a sequence of Landau-Zener transitions. Finally, atom-molecule coherent quantum beats in this system are studied and a ramping scheme is proposed for experimental investigation.

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