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Feshbach Correlations and Closed Channel Amplitudes NICOLAS LOPEZ, SHAN-WEN TSAI, UC Riverside, EDDY TIMMERMANS, Los Alamos National Lab — The magnetically controlled Feshbach resonance is a prominent member of the cold atom toolkit. The ability to tune binary particle interactions in a quantum many body system has given access to collapsing BEC-physics in bosenovas, to BEC-BCS crossover physics, to the unitarity regime, and to quantum phase transitions. The resonance is accessed by tuning the energy of a quasi-bound spin-rearranged molecular state near the vaccuum of the interacting particles. Does the amplitude of the spin-rearranged or "closed channel" state play a significant role in the many body physics? We present a microscopic derivation of the Feshbach resonance interactions and obtain the parameters of the two-channel model in a optical lattice. We study two atoms interacting in a harmonic oscillator potential near a Feshbach resonance to derive the closed channel probabibilty and to uncover the validity-range of the two channel lattice model.

Nicolas Lopez
UC Riverside

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