Abstract Submitted
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Multi-band scattering of two atoms in a one-dimensional lattice with on-site interactions[1] SETH RITTENHOUSE, Department of Physics, US Naval Academy, PANAGIOTIS GIANNAKEAS, Department of Physics and Astronomy, Purdue University, NIRAV MEHTA, Department of Physics and Astronomy, Trinity University — We examine a system of two-particles confined to a one-dimensional lattice described by a multi-band Hubbard model with on-site interactions. Asymptotically the two particles are relegated to remain in bands that are energetically accessible. However, when the particles occupy the same state, they can virtually scatter into bands that are energetically closed. We incorporate this virtual scattering by solving the Lippmann-Schwinger equation for the reactance matrix (K-matrix) using a lattice Green's operator. The resulting formula for the K-matrix for open band scattering bears a striking similarity to that which arrises from channel closing formulas in standard multi-channel scattering theory. We then apply this formula for two-body scattering in the lowest and first excited bands within a two band approximation. Within this approximation, virtual scattering into closed bands can create scattering resonances in the presence of bound states attached to closed bands in analogy to Feshbach or confinement induced resonances.

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