Abstract Submitted
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Ultracold two-body dynamics in optical lattices with topological singularities[1] DAVIT AGHAMALYAN, ANDREA SIMONI, JEAN-MICHEL LAUNAY, Institut de Physique de Rennes, UMR 6251 du CNRS and Univsersit de Rennes 1, 35042 Rennes Cedex, France — We study bound levels of two particles trapped in a 2D optical lattice. We use a short-range potential tuned to reproduce typical experimental conditions. Near-threshold bound states are computed using a spectral element discretization approach that guarantees exponential precision in the numerical results. High computational efficiency is attained due to the very sparse nature of the Hamiltonian in this representation. The calculated wavefunction is analyzed both in real and in momentum space. We perform calculations both for standard separable optical potentials and for lattice with topological singularities (Dirac cones) in the band structure. Extension to the calculation of scattering states will be addressed.

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