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【404】 Observation of confinement-induced resonances in a 3D lattice

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We report on the observation of confinement-induced resonances (CIRs) for strong zero-dimensional (0D) confinement in a three-dimensional (3D) optical lattice potential. Starting from a Mott-insulator state with mainly single-site occupancy, we detect loss and heating features at specific values for the confinement length scale and the 3D scattering length. Two independent models, describing the coupling between the center-of-mass and the relative motion of the particles as mediated by the lattice, predict the resonance positions to a good approximation, suggesting a universal behavior. Our results show that CIRs exist for any dimensionality and open up a new method for interaction tuning and controlled molecule formation under strong 0D confinement.

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