

Evolution of Matter Wave Interference of Bose-Condensed Gas in a 2D Optical Lattice

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Abstract: We investigate the average particle-number distribution of the atoms in the combined potential of 2D optical lattices and 3D harmonic magnetic trap based on the Gross-Pitaevskii equation. After the combined potential is switched off, and only the optical lattice is switched off, we give the analytical results of the wavefunction of the Bose-condensed gas at any time t by using a propagator method. For both disk-shaped and cigar-shaped Bose-condensed gas, we discuss the evolution process of the central and side peaks of the interference pattern.

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Key words: Bose-condensed gas, optical lattice, magnetic trap, interference

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