

BOSE-EINSTEIN CONDENSATES IN OPTICAL LATTICES: MATHEMATICAL ANALYSIS AND APPROXIMATE FORMULAS

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We show that GPE presents a set of ground states which is orbitally stable for any value of the self-interaction (attractive and repulsive) parameter and laser intensity. We also derive a new formalism which gives explicit expressions for the minimum energy E and the associated chemical potential mu . Based on these formulas, we generalize the variational method to obtain approximate solutions, at any order of approximation, for E , mu and the ground state psi .

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