Ground states in Gross–Pitaevskii equation

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Abstract

This presentation will focus on recent results and open problems regarding the existence of stable, localized in space solutions (ground states) of nonlinear Schroedinger equationwith an attractive potential (Gross–Pitaevskii equation). Such solutions are models for Bose–Einstein Condensates but their practical applications go beyond quantum gases to include optics and water waves among others. I will discuss symmetry breaking phenomena for potentials invariant under certain groups of symmetries, stability loss due to large number of particles (large L^2 norms) and stability loss due to time dependent perturbations.