

Abstract

Lea Boßmann (University of Tübingen)

Derivation of 1d and 2d Gross–Pitaevskii equations for strongly confined 3d bosons

Joint with Stefan Teufel

We study the dynamics of a system of N interacting bosons in a cigar- or disc-shaped trap, which initially exhibit Bose–Einstein condensation and interact via a non-negative interaction potential in the Gross–Pitaevskii scaling regime. The trap is realized by an external potential, which confines the bosons in two/one spatial dimensions to a region of order ε . We study the simultaneous limit $(N, \varepsilon) \rightarrow (\infty, 0)$ and show that the N -body dynamics preserve condensation. The time-evolved condensate wave function is the solution of a one/two-dimensional Gross–Pitaevskii equation.