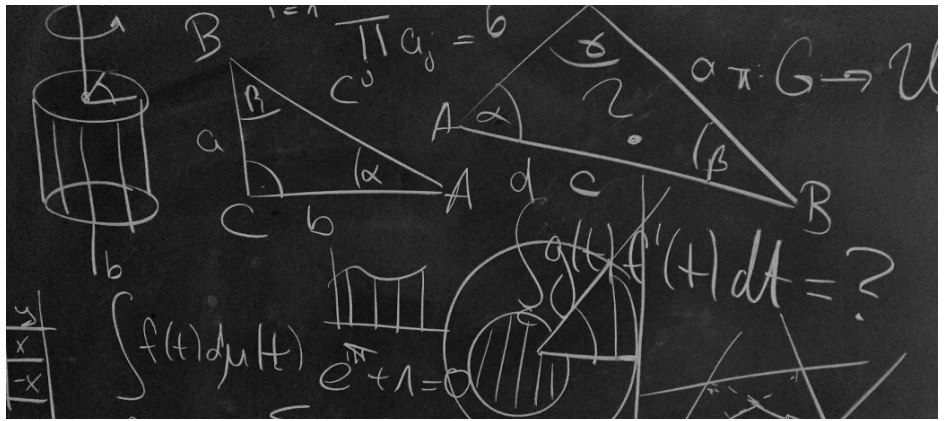


JUNI
25
17:00



Mathematik Kolloquium Innsbruck

Weizhu Bao

National University of Singapore

Mathematical Models and Numerical Simulation for Bose- Einstein Condensation

The achievement of Bose-Einstein condensation (BEC) in ultracold vapors of alkali atoms has given enormous impulse to the theoretical and experimental study of dilute atomic gases in condensed quantum states inside magnetic traps and optical lattices. In this talk, I will present a short survey on mathematical models and theories as well as numerical methods for BEC based on the mean field theory. We start with the Gross-Pitaevskii equation (GPE) in three dimensions (3D) for modeling one-component BEC of the weakly interacting bosons, scale it to obtain a three-parameter model and show how to reduce it to two dimensions (2D) and one dimension (1D) GPEs in certain limiting regimes. Mathematical theories and numerical Methods for ground states and dynamics of BEC are provided. Extensions to GPE with an angular momentum rotation term for a rotating BEC, to GPE with long-range anisotropic dipole-dipole interaction for a dipolar BEC and to coupled GPEs for spin-orbit coupled BECs are discussed. Finally, some conclusions are drawn and future research perspectives are discussed.

Montag 25. Juni 2018, 17:00 Uhr, HSB 6

Gäste und Studierende sind herzlich willkommen!

Institut für Mathematik, Universität Innsbruck, Technikerstraße 13, 7. Stock