



北京理工大学

数学与统计学院学术报告

Effective Approximation of Interacting Quantum Gases: Some PDE Problems

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摘要: This will be an informal discussion. In this discussion, we will review some old results in the field of mean-field approximation of interacting quantum gases. The emphasis of the discussion will be on the PDE aspects of the time-dependent Hartree-Fock-Bogoliubov (HFB) equation for Bosons (or the Bogoliubov-de Gennes equation for fermions). The HFB equation, in short, is a generalization of the nonlinear Schrodinger equation coupled with an effective dynamical two-body interaction description. One of the goals in the study of the HFB equation is to deduce the Gross-Pitaevskii equation from the HFB equation under an appropriate scaling limit; this problem remains open. In fact, many important problems regarding the solutions of the HFB equation remain unknown. Hence, the purpose of this talk is to organize a list of problems that one could start tackling.