

Graduate Applied Math Seminar

From quantum many body systems to nonlinear dispersive PDE, and back

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Abstract: Recently significant progress has been achieved in the mathematically rigorous derivation of the nonlinear dispersive equations from quantum systems of interacting bosons. This topic has been approached by many authors in a variety of ways, one of which is via the Gross-Pitaevskii (GP) hierarchy. The GP hierarchy is a coupled system of linear non-homogeneous PDE that describes the dynamics of a gas of infinitely many interacting bosons, while at the same time retains some of the features of a dispersive PDE. In this talk we will discuss the process of going from a quantum many body system of bosons to the nonlinear Schroedinger equation (NLS) via the GP. Also we will look into what the nonlinear PDE such as the NLS can teach us about the GP hierarchy and quantum many body systems. The talk is based on joint works with T. Chen and N. Tzirakis.

Monday, November 17 at 3:00 PM in SEO 1227