abstract

SPECIAL MATHEMATICAL PHYSICS SEMINAR
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

The NLSE is relevant for the explorations of Bose-Einstein Condensates and for Nonlinear Classical Optics. In presence of a random potential it can be used to study the competition between Anderson localization, that is characteristic of linear systems with random potentials, and effects of nonlinearities enhancing chaos and spreading. The one dimensional discrete version of this problem is particularly simple, but even for this problem it is not known, even on the heuristic level what is the asymptotic (in space and time) behavior of a wave packet that is initially localized in space. Numerical calculations exhibit sub-diffusive spreading while rigorous and other analytical results lead one to the conjecture that the asymptotic spreading is much slower, namely at most logarithmic in time. The heuristic justification of the numerical results is based on the fact that the NLSE can be considered a dynamical system where non-linearity implies chaos that looks like noise. The main difficulty obtaining asymptotic results from numerical calculations is in the identification of the asymptotic regime. A scaling theory was introduced (with Arkady Pikovsky) and it makes a clear prediction of the asymptotic behavior (under some assumptions).
This theory is the main subject of the talk.