Winter Colloquium Series

Solitary Wave Dynamics for Nonlinear Schrödinger Equations with Slowly Varying Potential

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Abstract:

Solitary waves (sometime called solitons) play a very central role in theory of focusing Nonlinear Schrödinger equations (NLS). In this talk we study the NLS on $\mathbb{R}^n$ with a slowly varying smooth potential, $V(x) = W(hx)$, and with an initial condition of a soliton. We show that up to time $|\log h|/h$ and errors of size h^2 in H^1, the solution is a soliton evolving according to the classical dynamics of a natural effective Hamiltonian. This serves as a nice example of the quantum-classical correspondence. To achieve this result we will use methods of classical dynamics on the space $H^1(\mathbb{R}^n, \mathbb{C})$ and spectral estimates of the linearized operator.

Thursday, February 25, 12:05 - 12:50pm in 3-1637