Department of Mathematics
University of Notre Dame

PDE, COMPLEX ANALYSIS AND DIFFERENTIAL GEOMETRY SEMINAR

Guest Speaker: Fangchi Yan

Virginia Tech

Date: Tuesday, May 14, 2024

Time: 11:00 AM

Location: 258 Hurley Bldg

Zoom URL: https://notredame.zoom.us/j/98530943143

Lecture Title:

The Schrödinger equation with cubic nonlinearities on the half-line in low regularity spaces

Abstract

The initial-boundary value problem for the Schrödinger equation with cubic nonlinearities of the form $u^{3-k}\bar{u}^k$ is studied on the half-line. Using the Fokas solution formula for the corresponding linear forced problem linear estimates are derived with data in Sobolev spaces and forcing in Bourgain solution spaces. Then, using these linear estimates and the trilinear estimates indicated by the forcing it is shown that the iteration map defined by the Fokas solution formula is a contraction in appropriate solution spaces. Thus, local well-posedness is proved for Sobolev exponents $s \geq 0$ when $k = 0, 1, 2$, and for $s > -1/3$ when $k = 3$. The methodology used is analogous to the one used for the corresponding initial value problems that is based on the Fourier transform for solving the forced linear problem.