

Talk title:

Global well-posedness and quasi-invariance of Gaussian measures for fractional nonlinear Schrödinger equations

Abstract:

In this talk, we discuss the long-time dynamics and statistical properties of solutions to the cubic fractional nonlinear Schrödinger equation (FNLS) on the one-dimensional torus, with Gaussian initial data of negative regularity. We prove that FNLS is almost surely globally well-posed and the associated Gaussian measure is quasi-invariant under the flow. In lower-dispersion settings, the regularity of the initial data is below that amenable to the deterministic well-posedness theory. In our approach, inspired by the seminal work by DiPerna-Lions (1989), we shift attention from the flow of FNLS to controlling solutions to the infinite-dimensional Liouville equation of the transported Gaussian measure. We establish suitable bounds in this setting, which we then transfer back to the equation by adapting Bourgain's invariant measure argument to quasi-invariant measures.

This is a joint work with Leonardo Tolomeo (Hausdorff Center for Mathematics).