OUT-OF-EQUILIBRIUM DYNAMICS FOR THE NONLINEAR SCHRÖDINGER EQUATION: FROM ENERGY CASCADES TO WEAK TURBULENCE

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Abstract
Out-of-equilibrium dynamics are a characteristic feature of the long-time behavior of nonlinear dispersive equations on bounded domains. This is partly due to the fact that dispersion does not translate into decay in this setting (in contrast to the case of unbounded domains like $\mathbb{R}^d$). In this talk, we will take the cubic nonlinear Schrödinger equation as our model and discuss some aspects of its out-of-equilibrium dynamics, from energy cascades (i.e. migration of energy from low to high frequencies) to weak turbulence. (Results from two recent joint works will be presented, the first in collaboration with E. Faou and P. Germain, and the second with B. Pausader, N. Tzvetkov, and N. Visciglia).