

James Colliander

Title: Big Frequency Cascades in the Cubic Nonlinear Schrödinger Flow on the 2-torus

Abstract: This talk will describe the construction of smooth solutions of the cubic nonlinear Schrödinger equation on the 2-torus for which the support of the conserved energy moves to higher Fourier modes. This behavior is quantified by the growth of higher Sobolev norms: given any $\delta > 1, K > 1, s > 1$, we construct smooth initial data u_0 with $u_0 \in H^s$, so that the corresponding time evolution u satisfies $u(T) \in H^s$ at some time T . This growth occurs despite the Hamiltonian's bound on $u(t) \in H^1$ and despite the conservation of the quantity $u(t) \in L^2$.