Well-posedness and finite-time blowup for the Zakharov system on the two-dimensional torus

Nobu Kishimoto (Kyoto University)

Abstract.
We consider the Zakharov system on two-dimensional torus. First, we show the local well-posedness of the Cauchy problem in the energy space by a standard iteration argument using the $X^{s,b}$ norms. Our result does not depend on the period of torus. Conservation laws and a sharp Gagliardo-Nirenberg inequality imply an a priori bound of solutions, which enables us to extend the local-in-time solution to a global one if its $L^2$ norm is less than that of the ground state solution of the cubic NLS on $\mathbb{R}^2$. We then show that the $L^2$ norm of the ground state is actually the threshold for global solvability, namely, that there exists a finite-time blow-up solution to the Zakharov system on 2d torus with the $L^2$ norm greater than but arbitrarily close to that of the ground state. This is joint work with Masaya Maeda (Tohoku University, Japan).