PROBABILISTIC LOCAL WELL-POSEDNESS AND SCATTERING FOR THE 4D CUBIC NLS

JONAS LUEHRMANN

We consider the Cauchy problem for the defocusing cubic nonlinear Schrodinger equation (NLS) in four space dimensions. It is known that for initial data at energy regularity, the solutions exist globally in time and scatter. However, the problem is ill-posed for initial data at super-critical regularity, i.e. for regularities below the energy regularity. In this talk we study the super-critical data regime for this Cauchy problem from a probabilistic point of view, using a randomization procedure that is based on a unit-scale decomposition of frequency space. In the first part of the talk we will explain how the problem of establishing almost sure local existence for the cubic NLS for such random data has some features in common with proving local existence for a derivative NLS equation. Our method is inspired by the local smoothing estimates and functional frameworks from the Schrodinger maps literature. In the second part of the talk we will turn to the long-time dynamics of the solutions. We will present a conditional almost sure scattering result and an almost sure scattering result for randomized radial data.

This is joint work with Ben Dodson and Dana Mendelson.