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Probabilistic local well-posedness and scattering for the 4D cubic NLS.

We consider the Cauchy problem for the 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 Schroedinger maps literature. If time permits, we will also present some (conditional) almost sure scattering results. (Received February 15, 2018)