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Solving the 4NLS with white noise initial data

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We will consider the fourth order Nonlinear Schrödinger equation, posed on the circle, with initial data distributed according to the white noise. This problem is well posed for smooth initial data. It is therefore natural to consider the sequence of smooth solutions with data distributed according regularisations (by convolution) of the white noise. We show that a renormalisation of this sequence converges to a unique limit. The limit has the white noise as an invariant measure. The proof shares some features with the modified scattering theory which received a lot of attention in the PDE community. As a consequence the solution has a more intricate singular part compared to the large body of literature on probabilistic well-posedness for dispersive PDE's. This is a joint work with Tadahiro Oh and Yuzhao Wang.

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