A Sharp Quasi-Invariance Result for Gaussian Measures under NLS with Quartic Dispersion

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Abstract. We present a result showing that Gaussian measures on Sobolev spaces are left quasi-invariance by a nonlinear Schroedinger equation on the torus: the statistical distribution of the solution is absolutely continuous with respect to that of the initial data. The result is sharp in the sense that it extends to all Sobolev spaces where the equation is well-posed in a reasonable sense. This is a probabilistic manifestation of the familiar competition between nonlinearity and dispersion: without the dispersive term, the distribution of the solution of the corresponding ODE on $H^S$ is singular with respect to the initial data for any positive time.

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