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Homogenization results for nonlinear Schrödinger equations

The cubic nonlinear Schrödinger equation (NLS) arises as a model for the propagation of intense continuous wave laser beams in a homogeneous medium. In practice, it has also been successful in modeling optical experiments in inhomogeneous settings. This suggests the occurrence of homogenization, that is, in a large scale limit, solutions to the inhomogeneous equation converge to the solution of a homogeneous NLS. We will review some recent homogenization results for physically motivated examples. While materials with a periodic structure are the most natural setting to consider this problem, our examples include a model where strong defects are sprinkled randomly across the medium. Part of this talk is based on joint work with B. Harrop-Griffiths.