

FIM

Nachdiplomvorlesung

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Singularity Formation in Nonlinear Dispersive Equations

March 3 - June 2, 2011
Thursdays 10.15 - 12.00h
HG G 43
ETH Zürich, Rämistrasse 101

Abstract

This series of lectures will be devoted to the description of the singularity formation for some nonlinear dispersive models. Most of our attention will be devoted to the focusing nonlinear Schrödinger equation

$$i\partial_t u + \Delta u + u|u|^{p-1} = 0, \quad x \in \mathbb{R}^N, \quad u(t, x) \in \mathbb{C}$$

which is a canonical model in various areas of physics including in particular nonlinear optics and plasma physics. While the existence of blow up solutions for this kind of problem has been known since the 60's in relation to a simple convexity argument, it is only since the mid 90's that the first explicit examples of blow up regimes have been described. The aim of these lectures is to give an overview of the progress made for the past ten years on the description of blow up and the related concentration of the nonlinear wave. While the Schrödinger model will be our waveguide, other important models including in particular nonlinear wave problems (like wave maps) will be addressed.

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