Karlsruhe Institute of Technology

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 25/26

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Seminar room: SR 3.069

Stability of Soliton for Nonlinear Non-integrable Schrödinger Equations with Non-trivial Far Field

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Abstract

Many innovative technologies in areas such as optical fibers, superfluids and Bose-Einstein condensates are based on quantum physical models described by nonlinear Schrödinger equations. Our main focus is put on the nonlinear Schrödinger equation with non-zero limit at infinity that is a generalization of the well-known Gross-Pitaevskii equation (GP) with a non-vanishing condition at infinity. The presentation will relate to defocusing nonlinearities for which we are specially interested and on the properties of travelling waves. Many different behaviors for these travelling waves have been highlighted, according to the shape of the non-linearity. Nevertheless, we have been able to prove the existence of travelling waves with small momentum. Moreover, we shall dwell on the existence and uniqueness travelling waves with speed close to the speed of sound, the orbital stability of a well-prepared chain of such travelling waves, as well as the asymptotic stability of these special solutions.