PHYSICAL MATHEMATICS SEMINAR

Existence, Stability and Dynamics of Solitary Waves, Vortices and Vortex Rings in Bose-Einstein Condensates: From Theory to Experiments

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ABSTRACT:

In this talk, we will present an overview of some of our recent theoretical, numerical and experimental efforts concerning the static, stability, bifurcation and dynamic properties of coherent structures that can emerge in one- and higher-dimensional settings within Bose-Einstein condensates. We will discuss how this ultracold setting can be approximated at a mean-field level by a deterministic PDE of the nonlinear Schrodinger type and what the fundamental nonlinear waves of the latter are, such as dark solitons (in 1d) and vortices (in 2d), as well as vortex lines and rings (in 3d). Then, we will try to go to a further layer of simplified description via nonlinear ODEs encompassing the dynamics of the waves within the traps that confine them, and the interactions between them. Finally, we will attempt to compare the analytical and numerical implementation of these reduced descriptions to recent experimental results and speculate towards a number of interesting possibilities for the future.

TUESDAY, DECEMBER 15, 2015
2:30 PM
Building E18, Room 466A

Reception following in Building E17, Room 401A
(Math Dept. Common Room)

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