Abstract

Oberwolfach Workshop:

Nonlinear Partial Differential Equations on Graphs

Dates:

18 June - 24 June 2017   (Code: 1725b)

Organizers:

Reika Fukuizumi, Sendai
Jeremy Marzuola, Chapel Hill
Dmitry Pelinovsky, Hamilton
Guido Schneider, Stuttgart

The workshop focuses on the analysis of nonlinear partial differential equations on graphs. One-dimensional metric graphs in two and three-dimensional spaces play an important role in emerging areas of modern science such as nano-technology, quantum physics, and biological networks. Nonlinear PDEs on graphs are fascinating subjects for mathematicians because they pose many challenging problems (similar to Schrödinger equations with singular potentials). Three concentration areas of the workshop cover:

1. Justification of Kirchhoff boundary conditions for metric graphs;
2. Spectral properties for nonlinear waves on periodic graphs;
3. Orbital and asymptotic stability of nonlinear waves on non-compact graphs.

Mathematical studies of nonlinear PDEs on graphs are developed by using many popular approaches, like calculus of variation, bifurcation theory, dynamical systems methods, applied harmonic analysis, perturbation theory, spectral theory, and numerical simulations. The intensity and extent of recent developments and the increasing amount of interesting problems arising from applications render especially timely a meeting that will bring specialists in the relevant areas together. The workshop will focus on aspects related to the dynamics of the nonlinear PDEs on graphs and on connections with relevant applications.