

Mini-Workshop “Analysis of PDEs”
March 27th - March 31st, 2023

16:30 - 17:30 pm, Wednesday, March 29th 2023
Seminar room: SR 1.067, Math Building 20.30

Frequency combs in dual-pumped nonlinear microresonators

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Abstract

In this talk I will discuss the Lugiato-Lefever equation (and its variants)

$$i \frac{\partial a}{\partial t} = (\zeta - i)a - d \frac{\partial^2 a}{\partial x^2} - |a|^2 a + i f(x, t)$$

which is a damped and driven nonlinear Schrödinger equation and which describes the field amplitude in a microresonator. Of particular interest in applications are frequency combs - which are particular states caused by the nonlinear interaction of the excited resonator modes. They are characterized in frequency space by a high optical bandwidth, narrow linewidth, large line spacings, and they have various applications in data transmission, optical ranging, and signal processing.

I will discuss recent results on cases where dual-pumping scheme (which is a particular shape of the forcing term $f(x, t)$) leads to interesting new qualitative and dynamic behaviour.

This is joint work with L. Bengel (KIT), E. Gasmi (KIT), T. Jahnke (KIT), M. Kirn (KIT), C. Koos (KIT), D. Pelinovsky (McMaster, Canada), and H. Peng (KIT).