

# Lothar-Collatz-Seminar

Wed, 25. Oct · 2:15 pm · Geom H3

**Dr. Dan J. Hill** (Universität des Saarlandes)

## From experiment to theory: Modelling localised spots on the surface of a ferrofluid

### Abstract:

Localised patterns, where a finite patch of heterogeneous solution is surrounded by a homogeneous flat state, are observed in many experiments and numerical simulations. However, our mathematical understanding of such structures remains extremely limited, especially in two spatial dimensions (and higher). In 2005, localised axisymmetric spots were observed on the surface of a magnetic fluid, known as a ferrofluid, after a uniform magnetic field was applied vertically through the ferrofluid.

In this talk I will introduce the ‘Rosensweig instability’ ferrofluid experiment and discuss how the problem has been studied via experimental and numerical collaborations. I will then discuss how one can mathematically study localised patterns by using tools from dynamical systems. Finally, I will look at the additional problems with trying to rigorously prove the existence of localised patterns on the surface of a ferrofluid.

For further information please contact

Dr. Claus Goetz ([claus.goetz@uni-hamburg.de](mailto:claus.goetz@uni-hamburg.de)), or visit  
[www.c3s.uni-hamburg.de/news-events/seminar-c3s.html](http://www.c3s.uni-hamburg.de/news-events/seminar-c3s.html)