

**RTG 1845**  
*M i n i c o u r s e*

Speaker:

**Dirk Blömker**  
(Universität Augsburg)

Title:

**" Modulation- and Amplitude-Equations for stochastic  
partial differential equations"**

Abstract: Modulation- or Amplitude-Equations are a universal tool to approximate solutions of complicated systems given by partial or stochastic partial differential equations (SPDEs) near a change of stability, when there is no center manifold theory available. Relying on the natural separation of time-scales at the bifurcation the solution of the original equation is well approximated by the bifurcating pattern with an amplitude that is slowly modulated in time and also in space, if the underlying domain is sufficiently large. The approach on a formal level is well known in the physics literature, and for partial differential equations on unbounded domains rigorously studied in the last two decades in numerous publications. For the course we focus on rigorous results for SPDEs.

We address first the case of bounded domains, where the amplitude is slowly moving in time and satisfies a (stochastic) ordinary differential equation. This is a qualitative replacement for center manifold theory and we discuss approximation of invariant measures and pattern formation below change of stability.

In a second part, we focus on results for SPDEs on sufficiently large or unbounded domains, where the amplitude of the domination pattern is also slowly modulated in space and solves a SPDE. We discuss the impact of the size of the underlying domain, stabilization due to degenerate additive noise.

Finally, we address problems with SPDEs on unbounded domains with additive noise.

Time & Place:

**Di** 14.07.2015, 16.00 - 17.30, room MA748 (RTG Lounge), TU Berlin  
**Do** 16.07.2015, 10.00 - 11.30, room MA748 (RTG Lounge), TU Berlin