

## TRR Guest Scientist Lecture / Seminar

Date/Time: 24.05.2016 / 2pm  
Location: Dortmund/Hörsaal 4, Hörsaalgebäude 2

**Rolf Binder**  
*University of Arizona*

### Formation and optical control of polaritonic density and spin patterns

#### Abstract:

Excitons in GaAs quantum wells and their interactions yield a wide variety of linear and nonlinear optical effects. In this talk, I will focus on the quantum fluid formed by exciton polaritons in a semiconductor microcavity. Here, four-wave mixing can lead to instabilities and the formation of spatial patterns in the polariton density. The control of the density patterns and of the far-field emission, which we believe can lead to new photonic devices, can be analyzed using the concept of non-equilibrium phase transitions. I will also discuss the optical control of spatial pseudo-spin textures, which arise as a consequence of pseudo-spin-orbit interaction (so-called optical spin Hall effect). As an aside, I will briefly discuss the interband dipole matrix element, which is an integral part of exciton physics, and which to this day causes much confusion in the semiconductor community.

Contact: Prof. Dr. Stefan Schumacher  
[Stefan.Schumacher@upb.de](mailto:Stefan.Schumacher@upb.de)

Prof. Dr. Manfred Bayer  
[Manfred.Bayer@tu-dortmund.de](mailto:Manfred.Bayer@tu-dortmund.de)