

# KIDS TALK

## “Magnetization dynamics from microscopic spin dynamics”

Speaker: Svenja Vollmar, AG Schneider

Abstract: Due to magnetic phenomena like spin dephasing, all optical switching or ultrafast demagnetization a microscopic description of magnetization dynamics is of great interest. To describe different aspects of magnetization dynamics, phenomenological models have been used with considerable success. However, they generally lack a microscopic description of the spin and charge degrees of freedom and, in particular, their interactions.

One model to describe such dynamics in a microscopic fashion in, e.g. 4f-systems such as the ferromagnet Gd, is the so-called s-d(f)-model. In this model two systems, one of the itinerant spins, carrying the charge and the second one, including the localized spins, and the interaction between those, are considered.

In the Kondo model only the interaction between the two reservoirs, but no interaction among the reservoirs, i.e., the electron-electron Coulomb interaction or the Heisenberg interaction among the localized spins, is included. We present the calculation of microscopic spin dynamics including a Rashba spin-orbit coupling in a model of itinerant carriers coupled antiferromagnetically to a macrospin due to the coupling to a phonon bath. This model describes a form of Elliot-Yafet type electron-phonon scattering within an equation of motion formalism. We extrapolate dephasing and magnetization times  $T_1$  and  $T_2$ .

Additionally we introduce our first attempt to a microscopic description of magnons in the quantum Heisenberg model.

When: Friday, June 20<sup>th</sup> 2014, **10:00 am**

Where: Room 46-387/388

All undergraduate and graduate students as well as postdocs are welcome and encouraged to join our discussion!

For subscription to kids talk mailing list, questions, comments or suggestions: [vlauer@rhrk.uni-kl.de](mailto:vlauer@rhrk.uni-kl.de)

\*\*\*\*\* COFFEE, TEA AND COOKIES WILL BE SERVED \*\*\*\*\*

