



PhD/Postdoc position in Spin Caloritronics (Mainz/Tohoku)

Within the international PhD program of the SpinNet project, a joint PhD position between the Department of Physics, Johannes Gutenberg University Mainz (Germany) and the Institute of Materials Research at Tohoku University (Sendai, Japan), is immediately available in the field of spin caloritronics.

The interplay between spin and heat transport has recently stirred much attention [1]. It was shown that temperature gradients associated with heat currents can generate spin currents in magnetic nanostructure [1, 2]. Furthermore, these thermal spin currents can also be used to manipulate magnetization and for instance engineer pinning of magnetic domain walls [3].

Electrical as well as optical detection is going to be used to determine thermally induced spin accumulation and the effects on magnetization. The temperature gradients can be obtained by Joule heating as well as optical Laser heating to locally generate strong differences in temperature. The detection of domain wall dynamics will be carried out by magneto-optical Kerr effect as well as magnetoresistive measurements.

The project is developed jointly drawing on the extensive experience of spin-caloric effects at Tohoku where this topic was pioneered and the experience of domain wall dynamics at Mainz. During the PhD, the student will have the opportunity to collaborate with both partners and depending on the interest stay at both institutions.

Requirements:

PhD position:

Diploma, Master or equivalent in physics, electrical engineering, materials sciences, etc. Knowledge in condensed matter, in particular magnetism would be advantageous.

For enquiries and applications including a full CV contact Prof. M. Kläui (Email: klaui@uni-mainz.de) or Prof. E. Saitoh (eizi@imr.tohoku.ac.jp).

SpinNet (www.spinnet.uni-mainz.de) brings together the leading spintronics groups at major international institutions. The physics department at the University of Mainz has been consistently ranked as one of the leading physics departments in Germany. It is the only physics department that received a Cluster as well as a Graduate School within the German Excellence Initiative. In the 2013 ranking it was selected for the excellence group in Europe and top 5 in Germany.

Tohoku University is the leading academic research institution in Japan currently ranked in the top 3 for physics in Japan. It has the strongest research environment for spintronics in the country and hosts the largest number of faculty staff working on spintronics at any academic institution worldwide. It is also one of the most attractive universities in Japan for foreign students with about 20% international PhD students

References:

- [1] K. Uchida et al., Nature 455, 778 (2008). [2] C. Jaworski et al., Nature Mat. 8, 898 (2010). [3] J. Franken, M. Kläui et al., Appl. Phys. Lett. 95, 212502 (2009) ; Sol. State Comm. 150, 489 (2010).