

Spintronics in complex oxide hybrid and heterostructures

Prof. Dr. Georg Schmidt, Institut für Physik & Center for materials science, Martin-Luther-Universität Halle Wittenberg, 06099 Halle, Germany, E-mail: georg.schmidt@physik.uni-halle.de

Complex oxides are an interesting class of materials for spintronics research and applications. Among others they have been used in tunnelling magnetoresistance elements because of high spin polarization or in hybrid structures for spin pumping [1] where ferromagnetic insulators like yttrium iron garnet (YIG) greatly facilitate the interpretation of experimental results.

In this presentation further progress in the utilization of ferromagnetic oxides for spintronics will be shown. On the one hand spin pumping and inverse spin-Hall effect in all-oxide heterostructures are presented. In these structures complex oxides are not only the source of spin pumping but they also act as the detecting spin sink which exhibits the inverse spin-Hall effect.

In addition new experiments on tunnelling anisotropic magnetoresistance (TAMR) in oxides will be shown. While TAMR in inorganic systems was limited to a few % until recently [2], we demonstrate that in a fully epitaxial stack of a ferromagnetic oxide and a complex oxide tunnel barrier TAMR can be as large as 50 %.

References

- [1] K. Uchida et al. Nature Materials **9**, 894 (2010)
- [2] C. Gould et al., Phys. Rev. Lett. **93**, 117203 (2004)

