



Walther-Meißner-Institut

Bayerische Akademie der Wissenschaften



Walther-Meißner-Seminar

Walther-Meißner-Institut, Seminar Room 143

Date: Friday, 20th July 2018, 13:30 h

Speaker: Akashdeep Kamra

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Title: Spin pumping and proximity effect in
ferrimagnet-(super)conductor hybrids

Abstract:

A combination of novel technological and fundamental physics prospects has sparked a large interest in pure spin transport in magnets, starting with ferromagnets and spreading to antiferro- and ferrimagnets. We discuss spin pumping from a general two-sublattice magnet into an adjacent metal. Our model allows arbitrary (disordered and asymmetric) interfaces. The obtained spin current expression includes intra- as well as cross-sublattice terms. We find that the cross-sublattice terms, disregarded in previous studies, play an important role and result in qualitative changes to our understanding of spin pumping in antiferromagnets. Inspired by these findings, we propose to employ the asymmetric interfaces to induce an effective exchange field in the metal, which is now assumed to be a superconductor. Taking interfacial disorder into account, we demonstrate that even an antiferromagnet causes disorder-resistant exchange field in the superconductor. Thus, antiferromagnets may be employed for inducing spin-splitting in the superconductor. This eliminates the parasitic, detrimental effects of a ferromagnet typically employed to this end.

References:

- [1] A. Kamra and W. Belzig, Spin pumping and shot noise in ferrimagnets: bridging ferro- and antiferromagnets, *Phys. Rev. Lett.* 119, 197201 (2017).
- [2] A. Kamra, A. Rezaei, and W. Belzig, Spin-splitting induced in a superconductor by an antiferromagnetic insulator, arxiv:1806.10356.