



Einladung zum Vortrag

Spin waves and magnetic flux quanta in hybrid nanostructures

anlässlich des Habilitationsverfahrens
für das Fach “Experimental Condensed Matter Physics ”

von

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Termin: Mittwoch, 23.09.2020, 14:30 Uhr

Zoom Meeting: <https://us02web.zoom.us/j/83611434743?pwd=ZHVqVU16VXMwdGdyQXRhcDhFMG9JQT09>

Superconductivity and magnetism belong to the most fundamental phenomena in condensed matter physics. Entailing opposite spin orders, they share an important conceptual similarity: disturbances in magnetic ordering in magnetic materials can propagate in the form of spin waves (magnons) while magnetic fields penetrate superconductors as a lattice of magnetic flux quanta (fluxons). Superconductor-based heterostructures allow for numerous possibilities for hybridization of superconducting and magnetic orders, giving rise to intriguing emerging phenomena unseen in individual constituents.

In my talk, I will overview selected recent results in the domains of cryogenic magnonics and non-equilibrium superconductivity which represent the major research lines in the SuperSpin Lab. In particular, in the focus will be the interaction of spin waves with a lattice of Abrikosov vortices in superconductor/ferromagnet heterostructures [1], microwave generation by moving fluxons [2], and vortex dynamics at large dc currents and high ac frequencies [3].

As a brief outlook, nanofabrication techniques of focused ion and electron beam induced deposition (FIBID and FEBID) will be introduced. The emphasis will be on (i) direct-write superconducting microstrips showing potential for single-photon detection [4] and (ii) complex-shaped 3D nanostructures for curvilinear magnetism and superconductivity [5].

- [1] O.V. Dobrovolskiy et al. Nat. Phys. 15, 477 (2019).
- [2] O.V. Dobrovolskiy et al. Nat. Commun. 9, 4927 (2018).
- [3] O.V. Dobrovolskiy et al. Commun. Phys. 3, 64 (2020).
- [4] O.V. Dobrovolskiy et al. Nat. Commun. 11, 3291 (2020).
- [5] A. Fernandez-Pacheco et al. Materials 13, 3774 (2020).

