

SFB 767 Seminar

Feb 22, 2019
10:00
P 602



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Magnetoelectric effects in S/F hybrids and Josephson detection of magnetization dynamics

It is demonstrated that the hybrid structures consisting of superconductors and spin-textured ferromagnets exhibit variety of equilibrium magnetoelectric effects originating from coupling between conduction electron spin and supercurrent. In S/F/S Josephson junctions the magnetoelectric effect takes the form of an anomalous ground state phase, while in S/F bilayer geometry it results in various phase-inhomogeneous superconducting states. It is discussed that the anomalous ground phase shift and inhomogeneous phase states are a manifestation of a generic supercurrent-mediated interaction between localized spins that breaks the global inversion symmetry of magnetic moments. The prospects of using the coupling between the superconducting condensate phase and the magnetization for Josephson detection of magnetization dynamics are discussed.

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