Seminář oddělení magnetik a supravodičů
Fyzikální ústav Akademie věd České republiky, v. v. i.

Knihovna FZÚ, Cukrovarnická 10, Praha 6
Čtvrtek, **18. 10. 2012** v **15:00** hod.

Interface-superconductivity in the presence of Rashba spin-orbit coupling and magnetic fields

Florian Loder

University of Augsburg

Abstract. Two-dimensional electron systems at oxide interfaces are influenced by a Rashba type spin-orbit coupling (SOC), which is tunable by a transverse electric field. Ferromagnetism at the interface can simultaneously induce strong local magnetic fields. This combination of SOC and magnetic fields leads to anisotropic two-sheeted Fermi surfaces, which enforces superconductivity with finite-momentum pairing. We derive a generalized pairing model realizing both, the Fulde-Ferrell-Larkin-Ovchinnikov superconductor in the limit of vanishing SOC and a mixed-parity pairing state with zero pair momentum in the absence of a magnetic field. In both limits, and also in the intermediate regime, we determine the superconducting order parameter self-consistently. We characterize the nature of this unusual pairing state and discuss it in the context of superconductivity in coexistence with ferromagnetism at $LaAlO_3$-$SrTiO_3$ interfaces.