TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

INSTITUT FÜR FESTKÖRPERPHYSIK
Institute of Solid State Physics

Wiedner Hauptstraße 8-10/138, 1040 Wien, AUSTRIA – T: +43-1-5880113801 / F: +43-1-5880113899 – E: sekretariat@ifp.tuwien.ac.at

EINLADUNG zum IFP-SEMINAR

Thema:	**Fermi surface(s) and superconducting gap(s) in bulk $SrTiO_3$**
Vortragende:	**Kamran Behnia** LPEM (UPMC & CNRS), Ecole Supérieure de Physique et de Chimie Industrielles (ESPCI), Paris, France
Host:	Silke Bühler-Paschen
Termin:	**Mittwoch, 08. Jänner 2014, 16:00 Uhr**
Ort:	Institut für Festkörperphysik, TU Wien Wiedner Hauptstraße 8-10, 1040 Wien Seminarraum 138B, 7. OG (rote Leitfarbe)

Abstract:

$SrTiO_3$ is a large-gap insulator, which upon the introduction of n-type carriers undergoes a superconducting transition below 1 K. Discovered in 1964, it has been the first member of a loose family of “semiconducting” superconductors, which now includes column-IV elements. The non-monotonous variation of the critical temperature with carrier concentration in $SrTiO_3$ defies the expectations of the crudest version of the BCS theory. We have found that down to concentrations as low as 5.5×10^{17} cm^{-3}, the system has both a superconducting ground state (the most dilute superconductor currently known) and a sharp Fermi surface [1]. Thus, the normal state is a metal whose Fermi energy is as little as 1.1 meV on top of a band gap as large as 3eV. We identify the long Bohr radius of this system as the factor pulling down the threshold of both metallicity and superconductivity. The survival of superconductivity in such a dilute metal with a Fermi temperature much smaller than Debye temperature excludes ordinary optical phonons as the pairing glue.

1) X. Lin, Z. Zhu, B. Fauqué and K. Behnia, Phys. Rev. X 3, 021002 (2013)