TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Referentin: **Dr. Dimitri Efremov**
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Thema: **Unexpected role of disorder in emergent materials** *(Vorstellung für Habilitation)*

Zeit und Ort: Dienstag, 03.12.2019, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Matthias Vojta

Kurzfassung: In the talk it will be shown that disorder plays an important role in many classes of emergent materials. First, the role of disorder in the multiband superconductors (such as Fe-based pnictides) will be reviewed. It will be shown that the impact of impurities in the multiband superconductors is beyond a common wisdom: the impurities in s+- superconductors suppress the transition temperature Tc in the same way as paramagnetic ones in conventional superconductors, and vice versa. Impurities (both nonmagnetic and magnetic) themselves can give rise to new phenomena like change of the symmetry of the superconducting order parameter. As a result, intrinsically phase-insensitive experimental methods like tunneling, ARPES, terahertz spectroscopy may be used for revealing of the information about the underlying order parameter symmetry. We present a comparison between theoretical and experimental investigation of a Ba(Fe0.9Co0.1)2As2 thin film by THz spectroscopy and stepwise proton irradiation. Then the emergent interaction driven topological insulators will be considered. It will be shown that disorder again may change the ground state and properties of the materials.

Biographie: PhD 1999, Moscow, Kapitza Institute for physical problems / 2000 - 2002 MPIPKS, Dresden / 2002 - 2004 Uni Groningen, The Netherlands / 2004 - 2009 TU Dresden / 2009 - 2012 Max Planck, Stuttgart / 2012 - present IFW Dresden. Research topics: strongly correlated systems, superconductivity, magnetism.