



TECHNISCHE UNIVERSITÄT  
CHEMNITZ

# Institut für Physik Physikalisches Kolloquium



**Mittwoch, 23.11.2016, um 16:00 Uhr**

Ort: Reichenhainer Str. 90;  
Zentrales Hörsaal- und Seminargebäude,  
Raum 2/N013

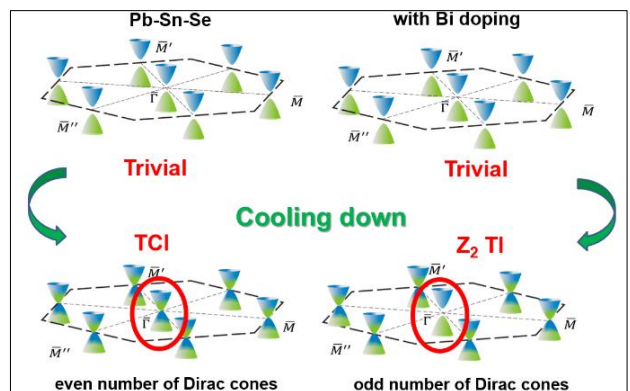
**Prof. Dr. Oliver Rader**

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Abt. für Magnetisierungsdynamik

## Topological phases in spin-orbit coupled systems and their manipulation

Topological matter is of high current interest as the bestowal of the Nobel prizes 2016 shows. Generally, a topological insulator features a metallic surface protected by time-reversal symmetry and an insulating bulk. We start from the first prediction of spin-orbit coupled topological systems for the example of graphene and discuss the properties of three-dimensional topological insulators through their signatures in spin- and angle-resolved photoelectron spectroscopy. We discuss the magnetic functionalization of topological insulators and the conditions for the creation of magnetic band gaps by impurities as they are a necessary condition for the quantum anomalous Hall effect. Topological insulators are a pure band structure effect, however, electron correlation would add interesting aspects.  $\text{SmB}_6$  has meanwhile been established as the first correlated topological insulator and the first topological Kondo insulator. We show, however, that the existing ARPES evidence does not support topological surface states and that the surface metallicity of  $\text{SmB}_6$  has a simple, topologically trivial origin. So-called topological crystalline insulators are more vulnerable systems where surface states are protected by mirror symmetries only instead of time-reversal symmetry. We show that the system  $\text{Pb}_{1-x}\text{Sn}_x\text{Se}$  can be driven by doping into a topological quantum phase transition from mirror- to time-reversal symmetry protection.



Alle Zuhörer sind ab 15:45 zu Kaffee und Tee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:

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[www.tu-chemnitz.de/physik](http://www.tu-chemnitz.de/physik)