



› Allgemeines Physikalisches Kolloquium

› Donnerstag, 23.06.2016 um 16 Uhr c.t.

Prof. Dr. Ralph Claessen

Physikalisches Institut, Universität Würzburg



Tin foil at the nanometer scale - from topological physics to electronic correlations

Compared to its semiconducting siblings C, Si, and Ge the group IV element tin (Sn) has always been a somewhat profane material. At ambient conditions Sn is a white-silverish metal and as tin foil ("Stanniolpapier") has long been used for wrapping food. At 13.2°C a structural phase transition into the diamond-like α -phase occurs, known as "tin pest" which in former times often destroyed church organ pipes in the winter time and contributed to Napoleon's defeat in his 1812 Russian campaign.

Here I want to demonstrate that Sn – in the form of (ultra)thin films – is also a fascinating quantum material displaying unusual topological and correlation effects, otherwise seen only in materials of much higher structural or chemical complexity. Examples include the identification of compressively strained α -Sn as 3D topological insulator (TI), the quest for "stanene", a new 2D Sn allotrope analogous to graphene and a novel candidate for the Quantum Spin Hall effect, and triangular Sn atom lattices on semiconductor substrates, which display Mott-Hubbard physics and even magnetic instabilities despite the frustrated geometry.

