Fritz-Haber-Institut der Max-Planck-Gesellschaft

Physikalische Chemie — Direktor: Prof. Dr. Martin Wolf

MAX-PLANCK-GESELLSCHAFT

Department Seminar:

Monday, June 4, 2018, at **11:00** a.m.;
— all are invited to meet at around 10:40 for a chat and coffee —

Dr. Hiroyuki Nakamura Novel Quantum Phases at Interfaces,
Department of Quantum Materials,
Max Planck Institute for Solid State Research,
Stuttgart.

Dirac related materials: Spin-momentum locking effects and beyond

PC Seminar Room G2.06, Building G, Faradayweg 4 L. Rettig

Abstract:

In 3D Dirac/Weyl semimetals, chirality (pseudospin) governs their physics. However, in general, real spin could also contribute to physical phenomena due to sizable spin-orbit coupling quite common in these materials. We aimed at disentangling the role of pseudospin and spin in the magnetotransport of a Dirac material Sr_3SnO, by analyzing the valley degree of freedom. Our results point to a dominant role of real spin, which we attribute to a unique spin-momentum locking effects at Dirac pockets in this material.

These experiments were made possible by recently developed molecular beam epitaxy (MBE) of antiperovskite 3D Dirac materials. I will also introduce another bottom-up growth technique specially designed for 2D transition metal dichalcogenides (TMDs): a hybrid pulsed laser deposition (PLD). Initial data suggest that the application of spectroscopic probes such as ARPES holds great promise, but also point to the necessity of more advanced technique to clarify the role of substrate/film interface.