



## PHYSIKALISCHES KOLLOQUIUM

*Referent:*

**Dr. Dominik Kraus**

Institute of Radiation Physics,  
Helmholtz-Zentrum Dresden-Rossendorf und  
Institute of Solid State and Materials Physics,  
Technische Universität Dresden



*Thema:*

**Warm Dense Matter: From Giant Planets and Stars to  
Nanoparticles** (*Vorstellung für Habilitation*)

*Zeit und Ort:*

Dienstag, 30.4.2019, 16:40 Uhr  
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

*Leiter:*

Prof. Dr. Thomas Cowan

*Kurzfassung:*

The interiors of planets and stars exhibit extreme conditions: High temperatures and enormous pressures create environments which are not fully understood and hard to encompass for state-of-the-art physics models. Applying the largest and most brilliant laser light sources, it is now possible to investigate such conditions in the laboratory. Recent efforts provide seminal insights into chemistry and phase transitions occurring deep inside giant planets and elucidate the electronic structure of elements in the interiors of brown dwarfs and stars. At the same time, highly interesting materials can be formed via these conditions, such as nanodiamonds or hexagonal diamond, so-called lonsdaleite, which, in its pure form, is predicted to exceed the hardness of cubic diamond. Finally, the applied methods also allow for testing the response of materials at extreme conditions and ultrafast timescales. I will present a showcase of recent experiments investigating these topics and provide an outlook for future developments, including the first corresponding experiments now scheduled at the European XFEL.

*Biographie:*

Dominik Kraus received his PhD at TU Darmstadt in 2012 for experimental work at the PHELIX laser of GSI, Darmstadt. He then moved to UC Berkeley as a postdoc to conduct experiments at the LCLS of SLAC National Accelerator Laboratory and at the National Ignition Facility of Lawrence Livermore National Laboratory. In 2016, he joined HZDR as a Helmholtz Young Investigator Group Leader and holds a TU Dresden Young Investigator status in cooperation with the Institute of Solid State and Materials Physics. Since 2018, he also heads the High Energy Density division at HZDR.

Mitglied von:



**DRESDEN  
concept**  
Exzellenz aus  
Wissenschaft  
und Kultur