



## PHYSIKALISCHES KOLLOQUIUM

*Referentin:* **Dr. Katerina Falk**  
Helmholtz-Zentrum Dresden-Rossendorf  
TU Dresden Young Investigator  
Dresden



*Thema:* **Equation of State and Transport Properties of Warm Dense Matter**  
(Vorstellung für Habilitation)

*Zeit und Ort:* Dienstag, 29.10.2019, 16:40 Uhr  
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

*Leiter:* Prof. Dr. Dominik Stöckinger

*Kurzfassung:* This talk will introduce experimental concepts used to study the equation of state and transport properties of Warm Dense Matter (WDM), a type of plasma regime at moderately high temperatures of 0.1 – 100 eV and solid densities common in astrophysical objects such as interiors of planets or crusts of old stars. WDM is also common in dynamic processes such as asteroid impacts. In WDM, the electrons are fully or partially degenerate and the ions strongly coupled, which makes the theoretical description of this state very challenging. WDM can be created in laboratory with the use of powerful lasers and its properties can be studied with novel x-ray methods, which will be described in this talk. With the dawn of ultra-fast ultra-intense laser facilities such as the world-class DRACO facility at HZDR, the pre-equilibrium electron dynamics that are responsible for transport properties such as diffusion, heat conductivity or particle stopping powers in WDM, can be accessed for the first time. These transport properties then influence the structure of planets and stars or determine the dynamics of supernova explosions. Applications of this research stem beyond Astrophysics, in particular to inertial confinement fusion (ICF) that could eventually lead to clean energy production.

*Biographie:* Katerina Falk studied at Imperial College London and obtained her doctorate from the University of Oxford in early 2012. After that she held a 3 year postdoc position at the Los Alamos National Laboratory in the USA. Then she moved to Prague to participate in the construction of a novel laser facility ELI Beamlines. Since March 2018, she has worked at Helmholtz-Zentrum Dresden-Rossendorf, where she set up her own group. Dr. Falk holds the Young Investigator status at TU Dresden since January this year and has lead an introductory course to Plasma Physics.

