# Doctoral Seminar

**Graduate Research Training Group (GRK)**

**www.physik.uni-rostock.de/grk/**

INSTITUT FÜR PHYSIK

Summer Term 2022

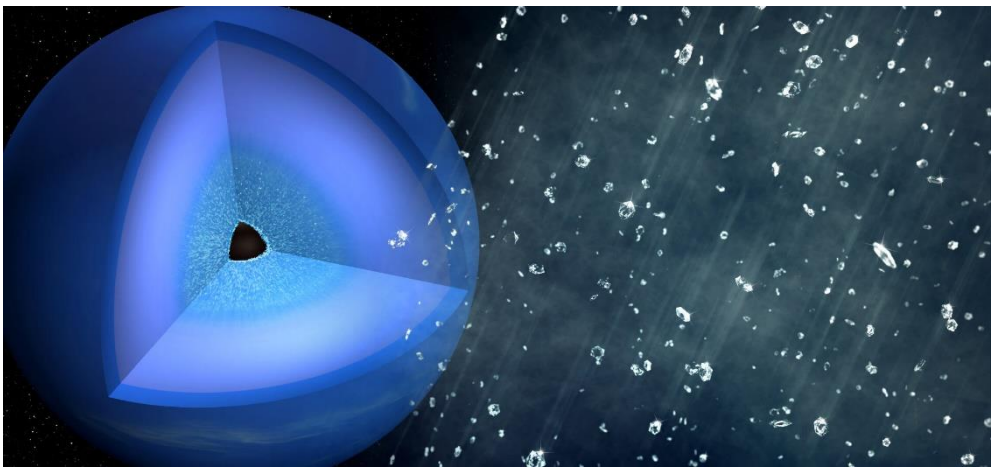
Traditio et Innovatio

Universität Rostock

**June 2nd, 2022, 3:00 pm**
**Benjamin Heuser, Divyanshu Ranjan, ChongBing Qu**
**High Energy Density Physics**

## High Energy Density Physics – An Overview

Warm dense matter (WDM) is a subject of importance to understand the formation and structure of planetary and stellar interiors. This regime is usually defined by temperatures between 0.1 and 100 eV and densities in the order of 0.1 – 10 times solid density. The environment created by high temperatures and high pressures is a young and highly evolving field of physics and still poses a challenge to modern research. Here the effects of condensed matter as well as strong coupling effects are on similar scales making the physics challenging. Using the world's largest and most intense laser light sources, it is now possible to recreate and probe these non-ideal conditions in the laboratory. By using powerful diagnostic methods like X-ray Thompson scattering (XRTS), X-ray diffraction (XRD) and small-angle X-ray scattering (SAXS) it is possible to probe these conditions. This provides fascinating insights into exotic processes such as the precipitation of diamonds in conditions like deep inside the planets Uranus and Neptune. The understanding could facilitate the dynamic synthesis of new materials like nanodiamonds and could help to improve planetary evolution models and non-ideal plasma theory. In this talk, we aim to introduce the work done by our High Energy Density group to understand these conditions better. We want to present the different diagnostic methods used by the group and share a few of our results.



Talk: English
Slides: English
**Location:** Great Lecture Hall, HS1, Institute for Physics, Albert-Einstein Str. 24

Hybrid-Meeting: https://uni-rostock-de.zoom.us/j/67191822515?pwd=UTVJSXVPaDVLV0ZSZW9LR3NRVWF2UT09