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CASUS Institute Seminar

Warm Dense Matter: From Giant Planets and Stars to Nanoparticles

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Date: Tuesday, 06 October 2020

Time: 14:00 – 15:00 CET

Location: CASUS Lecture Room, Görlitz

Abstract:

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.