

## Theoriekolloquium

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Am **9. Januar 2020** um **14.15 Uhr** in **W2 1-143** hält

**Herr Prof. Dr. Gerd Röpke (Rostock)**

einen Vortrag mit dem Titel

**Warm and dense matter: Bound states in dense plasmas,  
nuclear matter, and astrophysics**

New experimental facilities, such as the National Ignition Facility at Livermore using short-pulse high-intense laser beams or the Large Hadron Collider at CERN, allow to explore matter at extreme energy density in the laboratory.

This "warm dense matter" exists in astrophysical objects (planets, stars, supernova explosions, merging neutron stars) but is also of interest for technological applications, for instance inertial confined fusion or the production of new materials. The properties of warm dense matter, in particular the equation of state or transport properties, are described within a quantum statistical approach. A fundamental problem is the formation of bound states and their dissolution at high densities (Mott effect). Screening of the interaction, self-energy and Pauli blocking are considered to calculate the ionization degree of dense, partially ionized plasmas, and new experiments to determine the electrical conductivity and the ionization potential depression are discussed. Correlations, in particular alpha-particle like clusters, are of relevance in nuclear systems. Examples are the structure of light nuclei (Hoyle state of  $^{12}\text{C}$ ), the alpha decay of heavy nuclei, or the composition of neutron star matter. A challenge is the description of the formation of clusters in heavy-ion collisions which demands a non-equilibrium approach.

Interessierte sind herzlich eingeladen.

gez. Prof. Dr. Andreas Engel