

METALS UNDER EXTREMES: CHARACTERIZATION, PHYSICAL BEHAVIOR AND STRUCTURAL DESIGN UNDER HIGH PRESSURE AND AFTER HIGH-PRESSURE TORSION PROCESSING

FRIDAY SEPT. 26

Zoom: bit.ly/FORCEseminar

12 PM PDT/AZ

3 pm Eastern

The development of advanced technologies requires metals and materials that can withstand extreme environments, including ultra-high temperatures, pressures, and radiation damage. Conversely, such extreme conditions can also be exploited to design new materials with unprecedented properties. Central to both aspects is the characterization of materials—particularly their defect structures—under in-situ conditions at high temperature.

This talk will present advanced neutron and synchrotron diffraction techniques for probing structural states, their evolution, anisotropy, and inhomogeneity at room temperature and during heating. Following a brief introduction to modern diffraction methods and their complementarity in studying thermo-mechanical processes, an example of in-situ high-pressure and high-temperature experiments on titanium aluminides will be given.

The focus will then shift to materials processed by high-pressure torsion, where the mapping reveals inhomogeneities, residual stresses, and textures. Finally, an outlook will be provided on future applications using FORCE equipment—especially Twister—for the design of next-generation structural and functional materials.



KLAUS-DIETER LISS

University of Tennessee
Oak Ridge Innovation Institute

Klaus-Dieter Liss is a Research Professor at UT-ORII's Fusion Technology and Materials for Extreme Environments Convergent Research Initiative. He earned his degrees in Physics from the Technical University of Munich (B.S., 1990) and RWTH Aachen (Ph.D., 1995) in neutron and X-ray optics. His research centers on in situ diffraction studies of metals under thermal, thermo-mechanical, and extreme environments.

SEMINAR SCHEDULE

Fridays at 12 pm PDT/AZ

October 23

Leah Shteynman School of
Earth & Space Exploration,
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Future seminars TBD

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