



# DEPARTMENT SEMINAR

MONDAY, 18.09.2023, 10:00 a.m., Kolar Lecture Hall

## Research at ESI Leoben-From Fundamental Research to Application of Advanced Materials

**Prof. Jürgen Eckert and Dr. Andrea Bachmaier**

At the Erich Schmid Institute of Materials Science (ESI), fundamental research in the field of materials science is conducted. A large variety of material synthesis and processing methods is available at the ESI, which enables to synthesize powders, thin films and bulk materials with a constant expansion of the range of materials produced (e.g. magnetic materials, disordered systems, composites, etc.). The overall goal of the ESI is the comprehensive understanding of the physical properties of specifically tailored materials with excellent mechanical and functional properties. This goal is pursued within the framework of five closely related research themes: Plasticity, Fracture and Fatigue, Structural & Interface Engineering, Tailoring Functional Properties, Multiscale Mechanics, and Non-Equilibrium Materials Design.

In the talk, an overview of recent and ongoing activities and projects at ESI will be given. The emphasis is placed on processing and characterization of different metastable materials with tailored mechanical and functional properties, spanning all the way from high strength-high ductility materials, nanostructured magnetic materials by rapid quenching, additive manufacturing or severe plastic deformation to grain boundary engineering and materials for energy systems.

The general overview of the research activities at ESI will be followed by some specific examples describing results of ongoing projects related to nanostructured magnetic materials by severe plastic deformation. In severe plastically deformed binary and ternary immiscible systems, soft magnetic properties are obtained. Additionally, the use of the severe plastic deformation process to synthesize magnetic nanocomposites, exchange biased magnets and rare-earth free magnetic materials is presented.

**Kindly invited.**