

Kolloquium für Mechanik

Referent: **Professor Albrecht Bertram**
Technische Universität Berlin, Otto-von-Guericke-Universität Magdeburg

Date: Fr., 17.11.2017
Time: 14:00-15:30h
Location: Geb. 10.81, Emil Mosonyi-Hörsaal (HS 62, R 153)

Title: **A framework for elastic and plastic gradient materials**

Abstract

Many materials show effects which lead to the evidence of the existence of an internal length scale. Classical (simple) materials cannot describe such effects, in principle. Therefore an extension of this theory is needed. Since the pioneering works of Toupin and Mindlin half a century ago, gradient material models have become more and more popular to describe such effects. In such models, the stresses do not only depend on the strain tensor but also on its spatial derivatives. Such an ansatz immediately leads to some fundamental questions.

- Is this approach thermodynamically consistent?
- Do we need additional stress tensors?
- What are their symmetries?
- Do we need additional balance laws?
- What about the boundary conditions?
- How does elasticity for such models look like?
- How do symmetry transformations apply to elastic laws?
- How can we decompose these variables into elastic and plastic parts in the case of gradient plasticity?
- How can we handle such models numerically (FEM)?

and many more. These questions will be addressed in this talk.

As an example we show the deformation of an elastic body under point and line forces. This demonstrates the regularization ability of such models.

Reference

A. Bertram: Compendium on Gradient Materials. 3rd edition (2017) internet

Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Thomas Böhlke