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Kolloquium für Mechanik

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Date: Thursday, March 29, 2018
Time: 15:45 h
Location: Bldg. 10.81, Emil Mosonyi-Hörsaal (HS 62, R 153)

Title: **Continuum dislocation dynamics (CDD): a mesoscale crystal plasticity framework**

Abstract

Since the discovery of dislocations as carriers of plastic deformation, developing a continuum theory for motion and interaction of dislocations has been a challenging task. Such a theory should address two interrelated problems: how to represent the motion of dislocations in a continuum setting, hence the kinematics of curved and connected lines, and how to capture dislocation interactions.
In this regard, we introduce the Continuum dislocation dynamics (CDD) as a framework for representing the evolution of a system of curved and connected dislocation lines. In CDD, the microstructure is described in terms of a series of density-like tensorial variables where the accuracy can be prescribed by the resolution of the computational domain or by the order at which the tensorial series is truncated. CDD can operate on a wider spatial and temporal range than microscale models such as Discrete Dislocation Dynamics (DDD) and with a higher physical accuracy than phenomenological crystal plasticity. Therefore it is able to bridge the gap between these models. We present a mesoscale FEM crystal plasticity framework based on CDD and demonstrate its potential through few numerical examples.

Alle Interessenten sind herzlich eingeladen.

Prof. Dr.-Ing. Thomas Böhlke