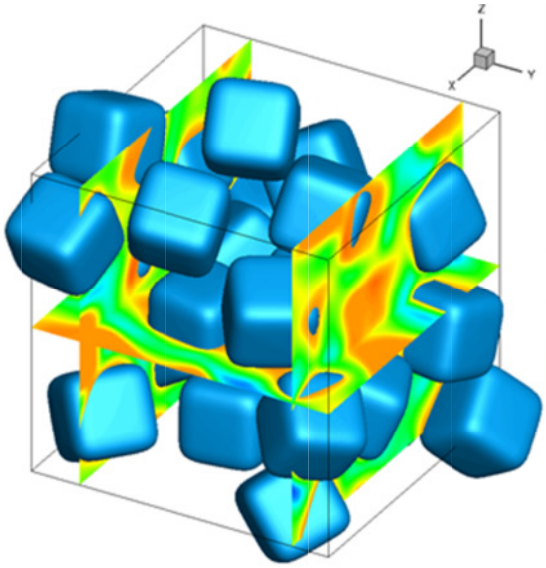
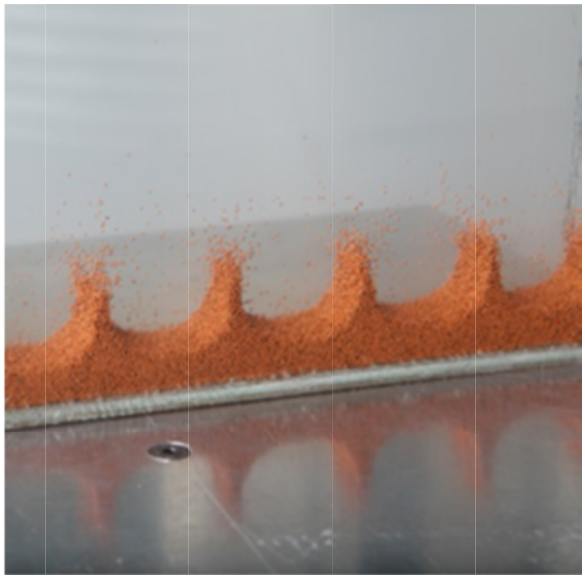
CBI ERLANGEN

Donnerstag 14. Juli 2016
16:15 Uhr, Hörsaal H3

Euler-Lagrangian modelling and Magnetic Resonance Imaging (MRI) of single- and two-phase granular systems

Christoph Müller
Institute of Energy Technology, ETH Zürich, Schweiz





Granular systems are frequently encountered in nature, e.g. Saturn's rings or rock avalanches, and industry with applications ranging from storing agricultural goods and granulation to fluid catalytic cracking. In addition, granular systems show a plethora of intriguing phenomena such as the formation of surface waves and oscillons in vibrated systems or segregation in rotating drums. However, despite their omnipresence, the underlying physics of such systems are only poorly understood and, unlike for fluids, currently, there does not exist a governing set of continuum equations describing accurately their behaviour. Our limited understanding of these systems is, at least partially, due to the fact that these systems are optically opaque, thus, making the acquisition of detailed experimental measurements very challenging. One particular aspect that complicates further the understanding and modelling of granular systems is that in most practical applications, particles are non-spherical. Thus, in this talk I will present advances in the modelling of non-spherical granular systems and the development of ultra-fast magnetic resonance imaging (MRI) techniques to probe the dynamics of granular systems. These measurements allow us to acquire two-dimensional slides in full three-dimensional granular systems with unprecedented temporal resolution, i.e. < 10 ms, making visible highly dynamic phenomena such as the splitting of bubbles in fluidized beds.

Kontakt: Prof. T. Pöschel, thorsten.poeschel@fau.de