technische universität dortmund

fakultät für mathematik

Kolloquiumsankündigung

Die Fakultät für Mathematik der TU Dortmund
lädt ein zu einem
Mathematischen Kolloquium
am Montag, 16. Januar 2012,
17.15 Uhr im Mathematikgebäude, Raum E28.

Es spricht:

Prof. Dr. Gero Friesecke
TU München

zum Thema:

Atomistic energy minimization, crystallization, and Wulff shapes.

Abstract:

The question how to rigorously derive continuum mechanics models of solids from atomistic models remains poorly understood.

This is because from an atomistic point of view, key phenomena such as elasticity, plasticity, fracture are "small" or "localized" deviations from crystalline order; but we do not really understand why crystalline order emerges in the first place.

I will review recent advances in the following two areas:

(i) Crystallization. One would like to show that, under appropriate conditions, minimizers $x_1,\dots,x_N$ of atomistic energy functionals such as $E(x_1,\dots,x_N)=\Sigma_{(1\le i\le j\le N)}V(|x_i-x_j|)$ arrange in crystalline order as N gets large.

(ii) Shape problems. One would like to show that in many situations, atoms assemble into specific shapes, governed by preferred solid-vapour interface orientations. In particular, I will explain the recent result that atomistic ground states of the 2D Heitmann-Radin model form regular hexagons as $N\to\infty$.

This follows by showing that in a suitable scaling limit, the atomistic energy converges (in the sense of De Giorgi's Gamma convergence) to a continuum Wulff-Herring surface energy.
(Joint work with Yuen Au Yeung and Bernd Schmidt, Calc.Var.PDE (Online First) 2011, arXiv 0909.0927v1.)

Hierzu laden wir alle Interessierten herzlich ein.

Vor dem Vortrag findet ein Institutstee statt (16.45 Uhr, Raum 643 (Banachraum)).