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Einladung

Im Rahmen des Schwerpunktskolloquiums „Analysis und Numerik" hält

Herr Prof. Dr. Hans-Dieter Alber (Technische Universität Darmstadt)

am **Donnerstag , dem 5. Juni 2014**, einen Vortrag zum Thema:

Hybrid phase field models and Eshelby flow of surfaces

Der Vortrag findet um **17:00 Uhr** in Raum **F 426** statt.

Es wird Gelegenheit gegeben, sich vorher (ab 16.30 Uhr)
im Common Center F 441 bei Tee und Kaffee zu treffen.

Alle Interessenten sind herzlich eingeladen.

Andrea Barjasic
Beauftragte für das Kolloquium

Abstract: By hybrid phase field midels I mean evolution equations of the form

$$\partial_t S = -c(\partial_S \psi(\varepsilon, S) - \nu \Delta_x S) \mid \nabla_x S \mid,$$

and

$$\partial_t S = c \operatorname{div}_x \Big(\Big(\nabla_x (\partial_S \psi(\varepsilon, S) - \nu \Delta_x S) \Big) \mid \nabla_x S \mid \Big),$$

which are coupled to other partial differential equations of mechanics, in my case to the elasicity equations. $S(t,x)$ is a scalar function, called order parameter and x denotes the coordinate of a material point of a solid body $\Omega \subset \mathbb{R}^3$.
Under the Eshelby flow I understand equations for the time evolution of surfaces, for which the driving force is not the mean curvature, but the jump of the Eshelby tensor across the surface (which is essentially equal to the mean value of the normal stresses on both sides of the surface). The mean curvature flow reduces the surface energy, the Eshelby flow reduces the elastic energy of the body.
In the talk I explain the mathematical considerations, which led to the formulation of the model equations, the connection to the Eshelby flow and the differences to the Allen-Cahn and Cahn-Hilliard equations.
However, there is no existence theorem in $\mathbb{R}^3$ available. Therefore the confidence in the hybrid model partly rests on results of numerical tests and simulations, of which many are available by now.

(Racke)