



## **Dr. Alberto Sicilia**

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### **”Coarsening in 2d: exact results, simulations and experiments”**

Dynamical systems quenched from a disorder into an ordered phase, may display coarsening phenomena. The simplest example is the Ising ferromagnet. When the system is cooled rapidly through the transition temperature, domains of the two ordered phases form and grow (coarsen) with time. In the present work we obtain the exact result for the statistics of the areas enclosed by domain boundaries for the coarsening dynamics of a nonconserved scalar field in two dimensions. This result represents the first analytical demonstration of the dynamical scaling hypothesis for this system. These results can be also generalized to the coarsening dynamics under the effect of finite temperature or the presence of quenched disorder. All these results have been tested with simulations on the two-dimensional square-lattice Ising model using a Montecarlo algorithm. We have also done experiments on the coarsening dynamics of liquid crystals. It was proposed that deracemization in this system is a curvature-driven process. We test this prediction using our exact result for the distribution of areas. We demonstrate that deracemization in such liquid crystals belongs to the Allen-Cahn universality class, and that the exact formula, can be used as a strict test for this dynamic universality class.

**Dienstag, 03. Februar 2009, 14 Uhr c.t.**

**Gebäude E2 6, Seminarraum E.04**

**Alle Interessenten sind herzlich eingeladen.**

Die Sprecher des Graduiertenkollegs  
Manfred Lücke und Ludger Santen

**Strukturbildung und Transport  
in komplexen Systemen**