NTZ
Naturwissenschaftlich
Theoretisches Zentrum

**Universität Leipzig**
Fakultät für Physik und
Geowissenschaften
**Institut für Theoretische Physik**

# NTZ - Kolloquium

Am Donnerstag, dem 29.11.2012 um 17:00 Uhr spricht

## Prof. Dr. Kurt Binder

(Universität Mainz)

über

# Contact angles, wetting transitions, and macroscopic interfacial fluctuations

**Abstract:**

The study of wetting phenomena at surfaces by means of Monte Carlo simulations is reviewed, with emphasis on recently obtained progress. Macroscopically, the transition from partial wetting to complete wetting occurs when the contact angle of a (large) droplet, that is described by Young's equation, vanishes. However, simulations deal with systems of nanoscopic dimensions, and simulations of nanodroplets (or fluids confined in nanocapillaries) are impractical due to various reasons. But for systems exhibiting a symmetry between bulk coexisting phases the wall tensions appearing in Young's equation can be directly estimated, using thermodynamic integration methods. The wetting transition then is directly located, using Young's equation, with no need to simulate droplets. Recently this approach has been extended to systems lacking any symmetry, applying an “ensemble mixing” method (combining a system with periodic boundary conditions with a system with walls). As an example, an application to the Asakura-Oosawa model of colloid-polymer mixtures is given. It is shown that by varying the range of the wall-colloid repulsion one can vary the behavior of the system from “complete wetting” to “complete drying”. For the case of critical wetting, a new finite-size scaling approach (with anisotropic correlations) is developed, and tested by the two-dimensional Ising model. Unlike bulk criticality, the order parameter at a second-order wetting transition fluctuates over a macroscopic range.

**Ort:** Hörsaal für Theoretische Physik, Linnéstraße 5

*Alle Teilnehmer sind ab 16:30 Uhr zu Kaffee und Gebäck in die Aula eingeladen.*

gez. Prof. W. Janke