# SFB 608

## Einladung zum Kolloquium

**Ort:** Universität zu Köln
II. Physikalisches Institut, Seminarraum 201

**Zeit:** Mittwoch, den 18.02.04, 15 Uhr c.t.

**Sprecher:** Dr. M. Pothoff
Institut für Theoretische Physik und Astrophysik
Universität Würzburg

**Thema:** Cluster approaches to correlated electrons in one and two dimensions

Based on a new variational principle, an extension of the cluster-perturbation theory is presented which applies to systems with spontaneously broken symmetry. The method accounts for both short-range correlations and long-range order: Short-range correlations are accurately taken into account via exact diagonalization of finite clusters. Long-range order is described by variational optimization of a ficticious symmetry-breaking field. In comparison with related cluster methods (cluster-DMFT), the approach is more flexible and, for a given cluster size, less demanding numerically, especially at zero temperature. An application of the method to the antiferromagnetic phase of the Hubbard model at half-filling shows good agreement with results from quantum Monte-Carlo calculations. It is demonstrated that the variational extension of the cluster-perturbation theory is crucial to reproduce salient features of the single-particle spectrum.

Gez. Prof. H. Monien
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