



## Dr. Fabien Trouselet

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### “Classical and quantum dimer models in 2 dimensions and some connections to strongly correlated electronic systems”

Dimer models can be used as effective models to describe magnetically disordered phases of various strongly correlated electronic systems: Mott insulators, frustrated classical spin systems, etc. In a part about classical 2D dimer models I will focus on the existence and properties of critical phases, characterized by transfer matrix techniques, to see the influence of the lattice geometry and of dimer-dimer interactions. The possibility of a continuously varying central charge in a model of several coupled dimer layers will also be considered. In another part we will see how a 2-color quantum dimer model can be used to describe the limit of strong Coulomb repulsion (vs. hopping amplitude  $t$ ) in an extended Hubbard model of electrons on the 2D pyrochlore lattice, close to commensurate  $(1/8)$  band filling. Exact diagonalization studies allow to identify different types of Valence Bond Solids in the infinite repulsion limit, and a transition to a metallic phase by decreasing the nearest neighbour repulsion.

**Freitag, 20. Februar 2009, 11 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**