DISAGREEMENT PERCOLATION FOR THE HARD-SPHERE MODEL

by *Christoph Hofer-Temmel*

Consider the hard-sphere model with homogeneous fugacity λ in d-dimensionsal space. For every finite volume and all boundary conditions, we are able to stochastically dominate two instances of the hard-sphere model (with arbitrary boundary conditions) simultanously by a Poisson point process of intensity λ. This is done by a dependent and recursive thinning and by introducing densities of couplings of simple point processes.

Disagreement percolation, introduced by Maes and van den Berg for lattice models, aims to compare the competing influence of different boundary conditions for finite volume specifications with a product field and then use percolation bounds on the product field to derive the uniqueness of the Gibbs measure.

The above simultaneous coupling permits a generalisation of disagreement percolation to the hard-sphere model. It delivers lower bounds for the uniqueness region of the hard-sphere model derived from the Boolean model. The results are better than theoretically best possible lower bounds by cluster expansion techniques. We also give an outlook on progress on the general case of marked Gibbs point processes.