

Institut für Diskrete Mathematik

**Combinatorics Seminar**

Friday 14th November 12:30

Online meeting (Webex) & AE06, Steyrergasse 30

# **On the probability that the mean-field random-cluster model is bipartite**

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The random-cluster model is a widely studied random graph model in statistical physics, generalizing bond percolation and the Ising and Potts models.

In the mean-field (complete graph) case, Bollobás, Grimmett and Janson determined the free energy of the model by studying the emergence of a giant component, drawing parallels to the evolution of the Erdős-Renyi random graph.

I will describe an adaptation of their argument to the case of complete bipartite graphs  $K_{n,m}$ , using a novel graph exploration algorithm and stochastic domination tools. I will then sketch some connections to the theory of unimodal graph polynomials.

As a corollary, we determine the rate function for bipartiteness of the supercritical mean-field Potts model.

Based on joint work with Matthew Jenssen and Will Perkins.

Webex link:

<https://tugraz.webex.com/tugraz/j.php?MTID=maf534adc0b2d38dd1859e16cbc8d5f84>

Mihyun Kang, Ronen Wdowinski