

Institute for Applied Mathematics, Bonn University

Oberseminar Stochastik

Thursday, 19 May 2022, 16:30

Lipschitz-Saal (LWK 1.016)

Davis Belius

Basel University

High temperature TAP upper bound

Mixed p -spin Sherrington-Kirkpatrick spin glass models are paradigmatic models of complex phenomena. Various methods to study them have been developed in physics and mathematics. An early proposal by Thouless-Andersson-Palmer (TAP) known as the "TAP approach" has recently enjoyed renewed interest. This talk will present an upper bound for the free energy of these models in terms of the TAP energy. The result applies to models with spherical or Ising spins with a linear external field or with a non-linear spike term. For the proof a geometric microcanonical method is employed, in which one covers the spin space with sets, each of which is centered at a magnetization vector m and whose contribution to the partition function is bounded in terms of the TAP energy. The result is from the recent preprint <https://arxiv.org/abs/2204.00681>.