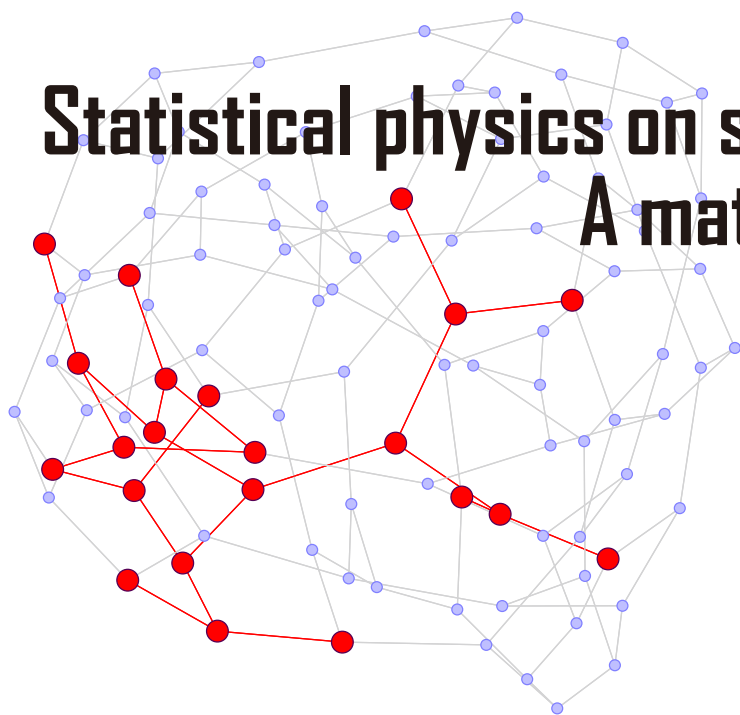


Statistical physics on sparse random graphs: A mathematical perspective



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127 Conference Room

Faculty of Science Bldg. #3, Kyoto University

Theoretical models of disordered materials yield precise predictions about the typical complexity of certain combinatorial optimization problems. The underlying common structure is that of many discrete variables, whose interaction is represented by a random 'tree like' sparse graph. I will survey recent progress in proving such predictions, the related insights gained from it, and certain interesting connections with spin-glass models, random matrices and extremal graphs.



❖ 本講義は「スーパーグローバルコース数学特別講義 2」として、大学院の学生には1単位認定されます。

Fri, Oct 28 12:30-14:30

Statistical Physics and Computation: Boltzmann-Gibbs distributions, factor models and Constraint Satisfaction Problems. Average complexity, ground states and sparse random graph ensembles. Locally tree-like graphs, Bethe-Peierls prediction and Belief Propagation equations.

Tue, Nov 1 13:00-15:00

Extremal cuts: From Sparse random graphs to spin-glasses.

Tue, Nov 8 14:45-16:45

The ferromagnetic Potts (and Ising) model: Proving replica-symmetric free energy prediction by interpolation and graph decimation.

Fri, Nov 11 14:30-16:30

Non-linear large deviations in counting (sparse) graph homeomorphisms and k-arithmetic progressions.

Fri, Nov 18 14:30-16:30

Gibbs measures, the set of near-optimal solutions for CSP-s and justifying the one Replica-Symmetry-Breaking prediction.

