

Seminar in Probability and Stochastic Processes 098435

Spring 2005

First Meeting: Wednesday 9.3.2005 12:30-14:30 Room 152 IE

Three topics we intend to cover are:

Stochastic Geometry of Interacting Spin Systems

Dima Ioffe

Lecture 1: Curie-Weiss mean field model: Formulation, phase transition, limit theorems.

Lecture 2: Sparse random graphs: Emergence of the giant component.

Lecture 3: Random graph representation of the Curie-Weiss model. Continuous time random graphs and quantum versions of the Curie-Weiss model.

Some problems in Gaussian processes and some problems in geometry

Robert Adler

Lecture 1: About maxima and geometry. Expansions of Gaussian processes, Poincare's limit theorem a la Diaconis, Gaussian processes and the infinite dimensional unit sphere.

Lecture 2: Lipschitz-Killing curvatures. Tube formulae and the fundamental kinematic formula on spheres. Minkowski functionals on Gauss space.

Lecture 3: A Gaussian kinematic formula. Back to maxima and geometry.

Hydrodynamic limits for interacting particle systems

Dima Ioffe (optional, if there is time and will)

Lecture 1: Simple exclusion and zero range processes

Lecture 2: Some martingales in the context of interacting particle systems and continuous time Markov chains.

Lecture 3: Tools: Tightness, large deviations, entropy inequalities and equivalence of ensembles.

All lectures will be two-hours lectures and of an introductory nature. Following these lectures, the students of the course will be expected to give presentations, on which we will base their grade.