Short Talks

Anatoli Iambartsev - IME-USP

Title: 2D Lorentzian Models in Quantum Gravity.

Abstract: Lorentzian models were introduced in physical papers about quantum gravity. Such models can be considered as an example of a new approach to quantum gravity, based on the notion of causal set. A causal set is a partially ordered set, thus having a causal structure, similar to the Minkowski space structure. There are two main approaches to the construction of random and quantum causal sets: the Gibbs and the Hamiltonian approaches. The Gibbs approach correspond to the Euclidian approach in quantum field theory, the Hamiltonian approach more resembles quantum spin systems. In this context, they give quite different models. In the critical Gibbs case, one can define the continuous limit but the unitarity is absent. In the Hamiltonian approach, on the contrary, one has the unitarity, however, the continuous limit gives unnatural results. This is a joint work with V.A.Malyshev and A.A.Zamyatin.

Andreas Schadschneider - Institute for Theoretical Physics, University of Cologne

Title: Truncated Asymmetric Random Average Process.

Abstract: We study numerically and analytically the one-dimensional truncated asymmetric random average process (TARAP) where the mass transfer is restricted by a cutoff. Two phases are found: a homogeneous phase and a condensed phase where a finite fraction of the total mass resides on one site. For small cutoffs both phases can coexist on a finite lattice. The lifetimes diverge in the thermodynamic

limit leading to a breaking of ergodicity.

Andrei Toom - UFPE

Title: 1-D particle systems with variable length.

Abstract: We present a new class of 1-dim particle systems, in which the number of components may change in the process of interaction. We shall examine one special case, which displays an analog of phase transition.

Balint Toth - Institute of Mathematics, TU Budapest

Title: Between equilibrium fluctuations and Eulerian scaling.

Abstract: We prove hydrodynamic limit for the propagation of small perturbation of equilibria for interacting particle systems with one, respectively, two conserved quantities. In the two-component cases we obtain an interesting family of hyperbolic systems of conservation laws. (Joint work with Benedek Valko.)

Bernardo Nunes Borges De Lima - IMPA

Title: Percolation of random words in deterministic enviroment.

Abstract: We will give some conditions for a random sequence of 0 and 1 be read in some graphs with a deterministic configuration of 0 and 1 in his vertices

Ciprian Tudor - Universite de La Rochelle, France

Title: Fractional Brownian motion and the weak convergence.

Abstract: We present some elements on the fractional Brownian motion and on the stochastic calculus with respect to this process. We also discuss the problem of the convergence in law of some absolute continuous processes constructed from a Poisson process to the fractional Brownian motion. We considered the one parameter case and the two parameters case.

Claudio Landim - IMPA, CNRS

Title: Superdiffusivity of asymmetric exclusion process.

Abstract: We prove that the diffusion coefficient for the asymmetric exclusion pro-

cess diverges at least as fast as $t^{1/4}$ in dimension $d = 1$ and $(\log t)^{1/2}$ in $d = 2$. The method applies to nearest and non-nearest neighbor asymmetric exclusion processes.

Domingos H. U. Marchetti - Instituto de Fisica - USP

Title: One-dimensional $\beta/|i-j|^2$ Random Cluster Models: An Oriented Percolation Proof.

Abstract: We consider one–dimensional Fortuin–Kasteleyn percolation models generated by bond occupation probabilities

$$p_{ij} = 1 - \exp\{-\beta/|i-j|^2\}$$

if $|i-j| > 1$ and $p_{ij} = p$ if $|i-j| = 1$, with weight factor κ. The model is defined in $\mathbb{R}_+$ with free boundary condition at the origin and with all bonds oriented from the left to right. A set $X \subset \mathbb{R}_+$ is connected if for each $x \in X$ there is a direct path of oriented occupied bonds from the leftmost site of X to x. Using Fröhlich–Spencer multiscale analysis we show that the percolation density M is strictly positive for any $\beta > 1$ and $\kappa \geq 1$, provided p is sufficiently close to 1. We also show that the truncated connectivity decays with a power $\theta = \min(2(\beta\eta - 1), 2)$ where $\eta = \eta(p) \nearrow 1$ as $p \nearrow 1$.

Dorival Leão Pinto Júnior - ICMC-USP

Title: Espaços de Radons.

Abstract: Neste trabalho, caracterizamos a classe de espaços mensuráveis (W , F) que tem as seguintes propriedades: 1. Admite probabilidade condicional regular para toda probabilidade P sobre (W , F) e sub-s-álgebra b contida em F; 2. Toda probabilidade P sobre (W , F) é perfeita (ou compacta); 3. Toda probabilidade P sobre (W , F) é quase-isomorfa à medida de Lebesgue sobre ([0,1] , b([0,1])). A classe de espaços mensuráveis satisfazendo estas propriedades independente da probabilidade P são denominados espaços de Radon.Finalizamos o trabalho com relações entre os espaços de Radon e o espaço de Cantor.

Eduardo Jordão Neves - IME-USP

Title: Differentially expressed genes.

Abstract: We present some ideas on the characterization and identification of differentially expressed genes using cDNA array technology. To illustrate, we apply our

methods to the real world: a study of gastric cancer - with data from high density cDNA arrays experiments - as part of our collaboration with prof. Luiz Fernando Reis, Ludwig Institute for Cancer Research.

Eliane Regina Rodrigues - Instituto de Matematicas - Universidad Nacional Autonoma de Mexico

Title: Some results about a branching particle system with changes of mass.

Abstract: In this talk we consider a branching particle system where particles may change mass and location as the time varies. Under suitable rescalling the process discribing the state of the system converges to a Gaussian process. Some properties of the limiting process will be shown. Results obtained from the simulation of a particular version of the process will also be presented. This is a joint work with Luis G. Gorostiza and Michael Porter.

Etienne Mahe - Universite de Rouen

Title: Gibbs measures, specifications rather than interactions for the variational principle.

Abstract: Properties of Gibbs measures are usually studied in terms of interactions. Such studies are sometimes hindered by the fact that each Gibbs measure can be described by infinitly many interactions. We have started a study of the variational principle begining from some hypothesis that are directly imposed on the specification rather than on the underlying interactions. Some results will be presented in this direction.

Fábio Prates Machado - IME-USP

Title: Branching random walk in random environment on a tree.

Abstract: We study a supercritical branching random walk on a rooted tree with random environment. We are interested in the case where both the branching and the step transition parameters are random quantities. Criteria of (strong) recurrence and (strong) transience are presented for this model. Tnis is a joint work with S. Popov.

Tomás Tetzlaff - Universidad de Buenos Aires

Title: Branching processes with not bounded types and applications to continuum percolation.

Abstract: Consider a discrete time branching process with an infinite set X of types and let Z(x,X) be the number of descendants of any type produced by an individual of type x in the first generation. Suppose $sup_x E(Z(x, X))$ is not finite. This is the case of a class of branching processes that can be used to dominate some continuum percolation clusters. For this class, the condition that the spectral radius of the associated integral operator is less or equal to 1, is found to be necessary and sufficient for the extintion probability to be 1 and applications are shown.

Gregory Maillard - Universite de Rouen

Title: Uniqueness, loss of memory and decay of correlations for non-markovian processes.

Abstract: In order to compare Gibbs measures with non-markovian processes, we establish a parallel between two-sided and one-sided conditioning. By using "dusting"technics, we obtain some new results about loss of memory and decay of correlations for non-markovian processes. These results are complementary to previous one by Harris, Berbee, and Bressaud, Fernandez and Galves.

Gunter Schütz - Institut für Festkörperforschung

Title: Phase separation in one-dimensional stochastic particle systems.

Abstract: We will present results on phase separation in one-dimensional stochastic particle systems.

Irina Kourkova - University Paris 6, FRANCE

Title: Derrida's generalised random energy model: a rigorous analysis.

Abstract: We present a full rigourous analysis of a class of spin glass models introduced by Derrida under the name of generalised random energy model (GREM): the convergence of extremal point processes to Poisson cascades, fluctuations of the free energy, the convergence of the Gibbs measure approached in two ways: directly via probability cascades and indirectly via Ghirlanda-Guerra identities. Finally, we provide a full rigorous analysis of the model with a "continuum of hierarchies".

Luiz Renato Fontes - IME-USP

Title: Convergence to the Brownian web.

Abstract: Arratia, and later Toth and Werner, constructed random processes that formally correspond to coalescing one-dimensional Brownian motions starting from every space-time point. We extend their work by constructing and characterizing what we call the Brownian web as a random variable taking values in an appropriate (metric) space whose points are (compact) sets of paths. This leads to general convergence criteria and, in particular, to convergence in distribution of coalescing random walks in the scaling limit to the Brownian web. (Joint work with M. Isopi, C.M. Newman and K. Ravishankar)

Marc Wouts - IMPA, Rio de Janeiro - ENS, Paris

Title: Sandpiles.

Abstract: We will define sandpiles and its dynamic, then prove that the critical density is one and examine more in detail the sub-critical phase. (Work in preparation with Prof. Vladas Sidoravicius)

Mariela Sued - IMPA

Title: Regularity properties of diffusion coefficient of the mean zero simple exclusion process.

Abstract: It is known that the hydrodynamic limit of the mean zero simple exclusion process is governed by a non linear parabolic equation. We prove that the diffusion coefficient is a regular function.

Miguel Abadi - Centre de Physique Theorique, Luminy

Title: Asymptotic average of repetition times.

Abstract: In 1992 Maurer proves that for i.i.d. random variables the limit of the difference between the non-overlapped repetition time of the initial n-string and n times the entropy converges to the number C equals to the Eulerś constant divided by $\ln(2)$. He conjectures that this limit holds for every ergodic stationary sources. Recently, the conjecture was proved to be false for dependent process and a correct asymptotic was proved for several authors in the context of Markov chains. We prove this asymptotic statistics with error bounds for a general class of processes so called ψ-mixing.

Remy De Paiva Sanchis - Departamento de Matematica - UFMG

Title: The Ornstein-Zernike Behaviour of the Bond Percolation Finite Connectivity Function for Large Values of p.

Abstract: Let $\tau^{\mathrm{f}}_{xy}(p)$ be the finite connectivity function of a d-dimensional bond percolation process on Z^d. For $d \geq 3$ and p close to 1, we prove the existence of polynomial corrections of the form $|x-y|^{\frac{d-1}{2}}$ to the exponential decay of $\tau^{\mathrm{f}}_{xy}(p)$ as the distance between x and y goes to infinity along the principal directions. (Joint work with G. Braga and A. Procacci.)

Ricardo Fraiman - Universidad de la Republica

Title: Impartial Trimming for Functional Data.

Abstract: The notion of impartial trimming is extended to functional data. Robustness properties are shown and the asymptotic behaviour is studied. A real data example from TV ratings is also analized.

Serban Nacu - UC Berkeley

Title: Glauber Dynamics on the Cycle.

Abstract: For the Ising model on a finite cycle, we prove that the relaxation time of the heat-bath Glauber dynamics is an increasing function of any one of the coupling constants.

Serguei Popov - IME-USP

Title: Limit law for transition probabilities and moderate deviations for Sinai's random walk in random environment.

Abstract: We consider a one-dimensional random walk in random environment in the Sinai's regime. It is proven that logarithms of the transition probabilities, after a suitable rescaling, converge in distribution to some functional of the Brownian motion. Also, the probability of being farther than $\log^{2+a} t$, $a > 0$, from the initial position at time t is studied. This is a joint work with Francis Comets.

Stefan Grosskinsky - Department of Mathematics, Technical University of Munich

Title: Stationary measures and hydrodynamics of the two-component zero-range process.

Abstract: The zero-range process is considered with two species of particles on a one-dimensional lattice with periodic boundary conditions. We identify a condition on the jump rates which allows us to characterize stationary product measures, which in general do not factorize with respect to the two species. For the driven system we derive the hydrodynamics up to the first shock and discuss it in the framework of hyperbolic conservation laws. We study stationary solutions of the boundary value problem and, in comparison to those results, we also analyze the zero-range process with open boundary conditions.

Valentin Sisko - IME-USP

Title: Weak limits of a symmetric two-dimensional zero-range process with random rates.

Abstract: We consider a two-dimensional symmetric zero-range process with site-dependent jump-rates — an environment. For each environment we prove that the set of all invariant measures is the convex hull of a set of product measures with geometric marginals. Suppose that the distribution of the environment λ is such that collections of rates in the sites are independent identically distributed. We show that for λ there are no invariant measures concentrating on configurations with density bigger than $\rho^*(\lambda)$, a critical value. We prove that for any initial distribution μ on initial configurations of the process the family of distributions obtained during the

evolution $\{\mu S(t)\}_{t\in[0,\infty)}$ is tight and that all weak limits of the process are dominated by invariant measure with density equal to $\rho^*(\lambda)$.

Xian-yuan Wu - IME-USP

Title: On AB bond percolation on the square lattice.

Abstract: We prove that AB site percolation occurs on the line graph of the square lattice when $p \in (1-\sqrt{1-p_c}, \sqrt{1-p_c})$, where p_c is the critical probability for site percolation in $\mathbb{Z}^2$. Also, we prove that AB bond percolation does not occur on $\mathbb{Z}^2$ for $p = \frac{1}{2}$.