SUMMARY

The school-conference LaPietra2011 was held in Firenze on June 13-17, 2011, at Villa Finaly. The event consisted of three 5 hours minicourses in the morning::

1) Vincent Beffara, CNRS, UMPA - ENS (Lyon) - Hugo Duminil-Copin, Univ. of Geneva (Geneva): Two-dimensional percolation with a glimpse of SLE.
2) Ivan Corwin, NYU-Courant (New York): The Kardar-Parisi-Zhang equation and universality class.
3) Eyal Lubetzky, Microsoft Research (Redmond): Cutoff for the Ising model on lattices

on the basis of three recent and very relevant theories that have been developed in the last 5 - 10 years.

In addition, there have been 15 more advanced half-hour talks by the main experts in research areas related to percolation, particles systems and statistical mechanics. Most of the talks were related to the topics presented in the morning.

The students attending the minicourses have had their opportunity to make shor 5 minutes presentations of their own work. Such presentations are often followed by more accurate discussions with the senior experts present at the conference.
Finally, during an open problems session there has been the possibility to exchange views on difficult topics, conjectures, open questions and so on.

There were more than 40 students, mostly Ph.D. students or young researchers, attending the school, coming from all over the world. The speakers of the advanced talks and of the other minicourses were also attending classes, so there were more than 60 participants at each lecture, forming a very rich, diverified and expert audience.

One can notice the very young age of most of the participants, of the students but also of the speakers, indicating that the researches in this fields are progressing very rapidly and very young and bright researchers are attracted to this area. Most of those who carried out the more outstanding researches were attending the school.

To give a full illustration of the event, in the following part of the report: “Illustration of scientific content and discussion of the event” we collect all the abstracts of minicourses and (long and short) talks. The results are discussed in the third part.

speaker	title	abstract
Minicourses		
Vincent Beffara - Lyon ---- Hugo Duminil-Copin - Geneva	Two-dimensional percolation with a glimpse of SLE	In recent years, important progress has been made in the field of two-dimensional statistical physics. One of the most striking achievement is probably Smirnov's proof of conformal invariance of percolation. This theorem, together with the introduction of the Schramm-Loewner Evolution and techniques developed over the years in percolation, allow to describe the critical and near-critical regimes of percolation very precisely. We will study site percolation on the triangular lattice. The principal aim of the mini-course is to focus on a spectacular result: the probability of 0 being connected to infinity by an open path behaves like (p-1/2)^{5/36} when p goes to 1/2. Contributors to this theorem include Kesten, Schramm, Lawler, Werner and Smirnov. The two first lectures will study crossing probabilities when the parameter p equals 1/2: we will present the Russo-Seymour-Welsh theory and the Cardy-Smirnov formula. The latter, sometimes referred to as the conformal invariance of critical percolation, will allow us to describe the scaling limit of interfaces. This fundamental fact is the crucial step in the computation of so-called critical exponents and the description of the scaling limit of percolation (the third lecture will be devoted to these subjects). In the fourth lecture, we will leave percolation with parameter 1/2 to study its dependence in p. We will prove that p=1/2 is the critical parameter of site percolation on the triangular lattice. The techniques that we use will allow us to study the near-critical percolation, and to derive the celebrated Kesten scaling relations, and the behavior at p_c. This last fact, which is the last step towards the theorem, will take us the last lecture. We will finish by giving several open questions and conjectures related to percolation. References: books: percolation Grimmett / percolation Bollobas-Riordan lecture notes: lectures on 2D critical percolation, Park City Lecture notes will be provided.
Ivan Corwin - New York	The Kardar-Parisi-Zhang equation and universality class.	Brownian motion is a continuum scaling limit for a wide class of random processes, and there has been great success in developing a theory for its continuum properties (such as distribution functions) and expanding the breadth of its universality class. Recently, a new universality class has emerged to describe a host of important physical and probabilistic models (such as one dimensional interface growth processes, interacting particle systems and polymers in random environments) which display unusual scalings and new statistics. This class is called the Kardar-Parisi-Zhang (KPZ) universality class and underlying it is, again, a continuum object -- now a non-linear stochastic partial differential equation -- which is known as the KPZ equation. The purpose of this mini-course is to (1) Develop the extent to which this class and equation are universal among a wide range of physical models and (2) Study an approach through which exact statistics of the KPZ equation are accessed. Additionally, an afternoon talk will supplement this second point by explaining other (both probabilistic and algebraic) means to access the solvability of the KPZ equation. Individual Talk titles: 1. Interacting particle systems, growth processes and the Kardar-Parisi-Zhang (KPZ) stochastic partial differential equation (SPDE). 2. A weakly asymmetric exclusion process approximation to the KPZ SPDE. 3. Fredholm determinants and Tracy and Widom's exact formula. 4. Asymptotics and the exact formula for the one-point solution to the KPZ equation. 5. Free energy of directed polymers References: 1. G. Amir, I. Corwin, J. Quastel. Probability distribution of the free energy of the continuum directed random polymer in 1+1 dimensions. Communications on Pure and Applied Mathematics. 64, (2011), 466-537. 2. L. Bertini, G. Giacomin. Stochastic Burgers and KPZ equation from particle systems. Communications on Mathematical Physics. 183, (1997), 571-607. 3. C. Tracy, H. Widom. Asymptotics in ASEP with Step Initial Condition. Communications on Mathematical Physics. 290, (2009), 129-154. 4. Lecture notes: I. Corwin. The Kardar-Parisi-Zhang equation and universality class. In preparation (will update when posted). 5. Lecture notes: C.Tracy and H. Widom. Formulas and Asymptotics for the Asymmetric Simple Exclusion Process. arXiv:1101.2682.
Eyal Lubetzky - Redmond	Cutoff for the Ising model on lattices	The following critical slowdown behavior is conjectured for the mixing-time of continuous-time Glauber dynamics for the Ising model on the lattice. For some critical temperature T_c, the mixing-time of the dynamics should be exponential in the surface-area at low temperatures $T < T_c$, logarithmic at high temperatures $T > T_c$ and obey a power-law at T_c. Furthermore, in the high temperature regime it should be that the dynamics exhibits the cutoff phenomenon, an abrupt convergence to equilibrium. Following some background on this critical slowdown picture and the cutoff phenomenon, the main focus of the lectures will be on the high temperature regime: We will present some of the ideas from a recent joint work with Allan Sly where cutoff was established whenever there is strong spatial mixing and its location was pinpointed in terms of the spectral gap of the infinite-volume dynamics. In particular, using results of Martinelli et al, this establishes cutoff and its location for any $T > T_c$ on $\Z^2$. The lectures will mostly be devoted to showing that cutoff occurs via a new technique for translating L^1-mixing to L^2-mixing of projections of the chain, which enables the application of logarithmic-Sobolev inequalities. A highly recommended reference for the course is the excellent account of Martinelli on Glauber dynamics, ``Lectures on Glauber dynamics for for discrete spin models'' (Lectures on probability theory and statistics, Saint-Flour 1997), available at <http://mpej.unige.ch/mp_arc/c/97/97-578.ps.gz>. For background on $L^1$ and $L^2$ mixing of Markov chains see the survey paper by Saloff-Coste ``Lectures on finite Markov chains'' (Lectures on probability theory and statistics, Saint-Flour, 1996) as well as the book ``Markov chains and mixing times'' by Levin, Peres and Wilmer, available at <http://research.microsoft.com/en-us/um/people/peres/markovmixing.pdf>. The work on cutoff for the Ising model on the lattice is itself available at <arXiv:0909.4320>.
Seminars		

speaker	title	abstract
Daniel Ueltschi - Warwick	Random permutations with cycle weights	We consider random permutations where cycles are weighted according to their lengths. I will report on recent results about the lengths of typical cycles, the total number of cycles, and the number of finite cycles. Works in collaboration with Betz and Velenik, and with Ercolani.
Peter Windridge - Warwick	Poisson-Dirichlet cycle lengths in probabilistic representations of quantum spin systems	We consider two models of random cycles on a graph. The models were introduced by Toth and Aizenman-Nachtergaele as probabilistic representations of the Quantum Heisenberg magnet. It turns out that the physically interesting questions concern the cycle lengths, in particular whether giant cycles emerge as the graphs grows. I'll summarise existing results and explain our conjecture that the asymptotic distribution of the normalised cycle lengths is Poisson-Dirichlet, paralleling a result of Schramm. This is ongoing work with Christina Goldschmidt and Daniel Ueltschi.
Alessandra Bianchi - Bologna	Metastable states, quasi-stationary measures, and exit time asymptotics via variational principles and exit time asymptotics via variational principles	In this talk I will present some recent results concerning the characterization of metastability in the sense of Lebowitz and Penrose for Markov processes on a finite configuration space and in some asymptotic regime. By comparison between the restricted ensemble and the quasi-stationary measure, I will derive simple and practical hypotheses to establish metastability and provide, by means of potential theoretic tools, sharp estimates on mean exit time and its asymptotic exponential law. (joint work with A. Gaudillière)
David Belius - Zurich	Cover times in the discrete cylinder	In the study of cover times of graphs by random walk it is expected for several classes of graphs that when the graph is large 'the rescaled and recentered cover time is close in law to the Gumbel extreme value distribution', but there are quite few non-trivial cases for which this has been proved. In my short communication I will present a recent result which proves a corresponding statement for random walk in the discrete cylinder using Sznitman's theory of random interlacements.
Ecaterina Sava - Graz	Growth models on the comb lattice	We introduce two growth models on the comb lattice: internal diffusion limited aggregation, in which random walkers move on the vertices of the lattice until reaching an unoccupied site where they stop; rotor-router aggregation in which particles perform deterministic walks, following an arrow pointing to one of the neighbours of the current site, and stopping when reaching a site unoccupied previously. For these models, we give the limiting shape of the set of occupied sites.
Anton Klimovsky - Eurandom	Gaussian random fields with isotropic increments seen through spin glasses	We show that the free energy of a particle subjected to arbitrary high-dimensional Gaussian random potential with isotropic increments admits a computable saddle-point variational representation. The representation is similar to the Parisi formula for the free energy of the Sherrington-Kirkpatrick model. The number of steps of the replica symmetry breaking that are necessary to get the exact representation depends on the range of correlations of the potential and on the symmetries of the particle state space.
Thomas Richthamme - Muenchen	The spectral gap of the interchange process - a proof of Aldous' conjecture	We consider a finite, connected, undirected graph with weighted edges. Labeled particles are assigned to its vertices (one to each vertex), and any two particles connected by an edge may interchange their positions at a rate given by the corresponding edge weight. The resulting continuous time Markov chain is called interchange process. The spectral gap of this process determines its rate of convergence to the uniform distribution. In about 1990 David Aldous conjectured that the spectral gap of the interchange process is the same as that of the random walk on the same graph, but so far this has been proved only in some special cases. We prove the conjecture using a recursive strategy. The approach is a natural extension of the method already used to prove the validity of the conjecture on trees. The novelty is an idea based on electric network reduction, where the edge weights play the role of conductances. The main technical obstacle is to show that this reduction decreases the total energy of the network corresponding to the (weighted) Cayley graph of the group of vertex permutations, generated by edge transpositions. Our method gives a proof of Aldous' conjecture in full generality. As a consequence we are able to relate the spectral gaps of various processes (such as subgraph processes or exclusion processes) to that of the random walk on the same graph. This is joint work with Pietro Caputo (Roma Tre) and Tom Liggett (UCLA).
Fabio Toninelli - Lyon	Dynamics of discrete monotone interfaces: a first step towards mean curvature motion	We discuss the Glauber dynamics for discrete monotone interfaces with fixed boundary height. This is equivalent to the zero-temperature Glauber dynamics for the 3d Ising model with Dobrushin boundary conditions and also to a Glauber dynamics on lozenge tilings of a finite region of the plane. When the boundary height is approximately planar, we obtain almost optimal bounds on the equilibration time. The proof exploits the "mean curvature heuristics" together with results about the Gaussian free field-like fluctuations of random lozenge tilings. Based on joint work with P. Caputo and F. Martinelli
Shankar Bhamidi - Chapel Hill-North Carolina	Emergence of the Giant Component in a Dynamic Random Graph Model	The last few years has seen an enormous amount of interest on various random graph models. A tremendous number of models have been proposed ranging from static models (such as the famous Erdos-Renyi random graph model and the configuration model) to more dynamic models, models that change over time such as the preferential attachment model. Many of these models are formed via the addition of edges to an existing configuration. In such models there exists a critical ``time" λ such that below this time, all components are small (the maximal component scales like $\log{n}$, where n is the number of vertices) while above this time a giant component emerges (where a unique component which scales like c n). We study the emergence of the giant component in a particularly famous example called the Bohman-Frieze process wherein at each stage one chooses two edges uniformly at random and then uses the first of it connects two singletons else we use the second edge. We study fine scaled asymptotics of the component sizes at criticality and show how after proper rescaling and recentering, the process of emergence of the giant component through the critical scaling window is described by the standard multiplicative coalescent. Joint work with Xuan Wang and Amarjit Budhiraja at UNC Chapel Hill
Pietro Caputo - Roma III	On the spectrum of heavy tailed random matrices	We consider the spectrum of random matrices with i.i.d. entries in the domain of attraction of an alpha-stable law, 0 < alpha < 2. We obtain convergence of the rescaled empirical spectral density, with limiting measure depending only on alpha. In the Hermitian case, the latter is characterized as the expectation of the spectral measure at the root for a random self-adjoint operator on a Poisson weighted infinite tree. In the non-Hermitian case, convergence is obtained via Girko's hermitization together with a random tree representation for the distribution of the singular values. The tree representation allows us to derive some properties of the limiting measures. In contrast with the Hermitian case, the limiting measure of the non-Hermitian case is not heavy tailed. This is work in collaboration with D. Chafai and C. Bordenave.
Serban Nacu - Stanford	Random Soups, Carpets and Fractal Dimensions	We study a class of random planar fractal sets induced by a Poissonian scale- and translation-invariant point process. Using the second-moment method, we show that their Hausdorff dimensions are deterministic and equal to their expectation dimension. We also estimate their low-intensity limiting behaviour. This applies in particular to the "conformal loop ensembles" defined via Poissonian clouds of Brownian loops. This is joint work with Wendelin Werner.

speaker	title	abstract
Michele Gianfelice - Calabria	On the Ornstein-Zernike behaviour for the Bernoulli bond percolation	We prove Ornstein-Zernike behaviour in every direction for finite connection functions of bond percolation on $\mathbb{Z}^d$ for $d\geq 3$ when $p& the probability of occupation of a bond, is sufficiently close to 1. Moreover, we prove that equi-decay surfaces are locally analytic, strictly convex, with positive Gaussian curvature
Marcelo Hilario - Rio de Janeiro	Coordinate Percolation on Z^3	Consider the set of columns of the Z^3 lattice that are parallel to one of the coordinate axis. We decide whether to remove the columns in this set independently from each other and with probability depending on their directions. Then we study the percolative properties of the random set of remaining vertices in Z^3. We show that this percolation model undergoes a phase transition as the removal parameters are varied: For high parameters there exist no infinite connected components whereas they do exist for small parameters. We also show that the rate of decay of the tail of the (truncated) radius of the cluster containing the origin in not always exponential: That rate is at most polynomial if two or more removal parameters are set high enough.
Matthijs Joosten - Amsterdam	Dimension (in)equalities and H\"older continuous curves in fractal percolation	In this short talk I will introduce the fractal percolation model and state our main results. These results deal with bounds on various fractal dimensions of the connected components. Also, we show that the set of connected components is a union of H\"older continuous curves.
Lorenzo Cecconi - Firenze	A nested modular spatial epidemic model and long range percolation.	In this talk we introduce a Reed-Frost epidemic model based on a modular spatial scale-free random graph. By exploring its relation to long-range percolation and extending a recent inequality by Meester and Trapman, we determine the phase diagram and show that the model interpolates between long- and short-range percolation. This is a joint work with Alberto Gandolfi.
Vincent Tassion - UMPA, ENS Lyon	The critical value function in the divide and color model	The divide and color model on a graph G is a long-range dependent site percolation model: it arises by first deleting each edge of G with probability 1−p independently of each other, then coloring the resulting connected components (i.e., every vertex in the component) black or white with respective probabilities r and 1−r, independently for different components. For fixed p, monotonicity in r allows to define the critical point rc(G,p). If G is the square lattice, rc(G,p)=0 for all p>1/2, rc(G,p)=1 for p=1/2, and nontrivial but unknown for p<1/2. After a brief Introduction to the model, we will present recent results describing the behavior of the critical point rc(G,p) as a function of p and discuss the main questions and difficulties in the study of the model.
Christophe Garban - ENS Lyon	Critical percolation under conservative dynamics	Dynamical percolation is a process (omega_t) on percolation configurations where sites (or edges) are updated independently of each other at rate 1. Doing so, if one starts with an initial critical configuration omega_0, then at any later time t>0, omega_t is also a critical percolation. Over the past years, it has been proved that as time t goes on, there will be "exceptional" times t, for which the critical configuration omega_t is "atypical". For example there are exceptional times where an infinite cluster appears (which a.s. does not happen in the static case). In this talk, I will introduce a "conservative" variant of the above model. More precisely, consider the percolation configuration as a system of "particles", each particle corresponding to an open site (or edge). In the earlier mentioned model, particles would appear and disappear in a Poissonian way independently of each other. In order to make the dynamics "conservative", one way is to assume that the particles will now evolve according to a symmetric exclusion process in the plane (with some transition kernel P). In joint work with Erik Broman and Jeff Steif, we study the properties of this conservative dynamics. The main issue one has to deal with is that all the tools that have been developed so far to understand dynamical percolation or more generally "noise sensitivity" of percolation, are based on discrete harmonic analysis. These spectral tools are very suitable to "i.i.d noising" but unfortunately do not easily transfer to the conservative setting. I will explain how to overcome this issue and discuss the question of exceptional times in the conservative case.
Pieter Trapman - Stockholm University, Sweden	The growth of the infinite long-range percolation cluster and an application to spatial epidemics	Consider long-range percolation on $\mathbb{Z}^d$, where the probability that two vertices at distance r are connected by an edge is given by $p(r) = 1-\exp[-\lambda(r)] \in (0,1)$ and the presence or absence of different edges are independent. Here $\lambda(r)$ is a strictly positive, non-increasing regularly varying function. I will discuss the growth of the number of vertices that are within graph-distance k of the origin, $|\mathcal{B}_k|$, as $k \to \infty$. Conditioned on the origin being in the (unique) infinite cluster, non-empty classes of non-increasing regularly varying functions are identified, for which respectively - $|\mathcal{B}_k|^{1/k} \to \infty$ almost surely, - there exist $1 <a_1 < a_2 < \infty$ such that $\lim_{k\to \infty} \mathbb{P}(a_1<|\mathcal{B}_k|^{1/k}< a_2) = 1$, - $|\mathcal{B}_k|^{1/k} \to 1$ almost surely. This result can be applied to spatial epidemics. In particular, regimes are identified for which the basic reproduction number, R_0, which is an important quantity for epidemics in unstructured populations, may have a useful counterpart in spatial epidemics. this talk is based on: - P. Trapman (2010), The growth of the infinite long-range percolation cluster, Annals of Probability. - S. Davis, P. Trapman, H. Leirs, M. Begon and J.A.P. Heesterbeek (2008), The abundance threshold for plague as a critical percolation phenomenon, Nature.
Remco van der Hofstad EUT - Eindhoven	The percolation phase transition on the n-cube	Consider bond percolation on the Hamming n-cube {0,1}^n at the critical probability p_c defined such that the expected cluster size equals 2^{n/3}, where 2^{n/3} acts as the cube root of the number of vertices of the n-cube. Percolation on the Hamming cube was proposed by Erd"os and Spencer (1979), and has proved to be substantially harder than percolation on the complete graph. In this talk, I will describe the phase transition for percolation on the n-cube, and show that it shares many features with that on the complete graph. In previous work, we have identified the subcritical and critical regimes of percolation on the n-cube. In particular, we know that for p=p_c(1+O(2^{-n/3})), the largest connected component is of size roughly 2^{2n/3} and that this quantity is non-concentrated. So far, we were missing an analysis of the behavior of the largest connected component above the critical value, to show that the critical value really is critical. In this work, we identify the supercritical behavior of percolation on the n-cube, by showing that, for any sequence \epsilon_n tending to zero, but \epsilon_n being much larger than 2^{-n/3}, percolation at p_c(1+\epsilon_n) has, with high probability, a unique giant component of size (2+o(1))\epsilon_n 2^n. This is joint work with Asaf Nachmias, building on previous work with Markus Heydenreich, Gordon Slade, Christian Borgs, Jennifer Chayes and Joel Spencer.

speaker	title	abstract
Bernardo Nunes de Lima - IMPA Brazil	Critical Point and Percolation Probability in a Long Range Site Percolation Model on $\Z^d$	Consider an independent site percolation model with parameter $p \in (0,1)$ on $\Z^d,\ d\geq 2$ where there are only nearest neighbor bonds and long range bonds of length k parallel to each coordinate axis. We show that the percolation threshold of such model converges to $p_c(\Z^{2d})$ when k goes to infinity, the percolation threshold for ordinary (nearest neighbour) percolation on $\Z^{2d}$. We also generalize this result for models whose long range bonds have several lengths. Joint work with Rémy Sanchis and Roger W.C. Silva.
Jacob van den Berg, CWI - Amsterdam	Extensions of the BK inequality	The BK inequality, proved by van den Berg and Kesten in 1984 says that, for product measures on {0,1}^n, the probability that two increasing events `occur disjointly' is smaller than or equal to the product of the two individual probabilities. This result is often used in percolation and interacting particle systems. Their conjecture that the inequality even holds for all events was proved by Reimer in 1994. In spite of Reimer's work, several natural, fundamental problems in this area remained open. Very recently there has been interesting progress. In particular I will discuss an extension to randomly drawn subsets of fixed size (joint work with Johan Jonasson). I will also mention a modified version of the notion `disjoint occurrence' for the Ising model (work in progress with Alberto Gandolfi).
Amir Dembo, Stanford Univ. - Stanford	Free energy for Potts models on locally tree-like graphs.	For Potts models on sparse graphs that converge locally tosome unimodular tree we prove the existence of free energy density for weak interactions (high temperature) and for strong enough interaction (low temperature). In case of Ising models and for uniform random d-regular graphs our result extends to all values of temperature and external field parameters. Beyond existence of limiting free energy, we provide an explicit formula for its value hence rigorously verify and generalize the statistical physics replica prediction for such models. This talk is based on joint works with Andrea Montanari, Allan Sly and Nike Sun.
Vladas Sidoravicius CWI - Amsterdam	From Random Interlacements to Coordinate Percolation	
Filippo Colomo - Firenze	Arctic Curves for 2D models of interacting dimers	The Arctic Circle Theorem (Jockusch-Propp-Shor) concerns a model of domino tiling (of a peculiar region, the so called Aztec Diamond) exhibiting sharply separated ordered and disordered regions, with the emergence of `limit shapes' and `arctic curves'. The calculation of such objects, and the characterization of their fluctuations, has been performed for several other models (Cohn, Propp, Kenyon, Reshetikhin, Okounkov, and others), with deep implication in algebraic combinatorics and algebraic geometry. However all such models can be viewed as models of dimers, i.e. of discrete free fermions. Their most natural generalization to include an interaction (i.e. a non-uniform probability) is provided by the Six-Vertex model with domain-wall boundary conditions. In a series of papers, we have recently derived, for the full phase diagram of the model, the exact analytic expression of the arctic curve, and characterized its fluctuation, thus extending the Arctic Circle Theorem beyond the dimer (free fermion) case. As a side result, we have evaluated the limit shape of large Alternating Sign Matrices. (Joint work with Andrei Pronko, PDMI-Steklov, SPB)
Tal Orenshtein - Israel	0-1 law for recurrence of 1D multi excited random walk.	Generalizing Benjamini-Wilson's 2003 Excited Random Walk, Zerner 2005 introduced 1D Multi Excited Random Walk (MERW) in deterministic (and random) environments. In a series of works, among them Zerner 2005 and Kosygina-Zerner 2008, MERW in environments obeying some conditions is discussed. In these works, a complete description for recurrence/transience is achieved and in particular, a 0-1 law for recurrence is derived. After defining the model, we will state a 0-1 law for recurrence of MERW in more general environments and raise an open problem.
Alessandra Cipriani - Zurich	Pinning problem for the membrane model: the supercritical case	The membrane model describes the behaviour of a random interface on a box in $\mathbb Z^d$. We would like to investigate the properties of the field when we give a positive reward to the interface every time it touches zero. The critical dimension for this model is $d=4$, therefore we try to prove the localization of the field in $d \geq 5$ independently of the reward
Balint Veto - Budapest	Central limit theorem for the myopic self-avoiding walk	The myopic self-avoiding walk on the integer lattice Z^d is a self-repelling random walk defined in a natural way by local self-interaction. The walker is pushed locally by the negative gradient of its own local time towards less visited areas. If the dimension is at least 3, we give central limit theorem for the displacement in terms of the finite dimensional distributions with non-degenerate limit for a certain class of self-repellence.
Quentin Berger - Lyon	Pinning model in random correlated environment	Random pinning models are used in physics to modelize the behavior of a polymer interacting with a line of defects. One observes a localization/delocalization transition, from a phase in which the polymer wanders away from the line, to a phase in which it is pinned on the line. We will focus on the case where the interactions are random and present long-range correlations, and underline how the phase transition is modified.
Laurent Tournier IMPA - Rio de Janeiro	Quenched and annealed fluctuations of transient random walks in random environment on Z	In a 1975 paper, Kesten, Kozlov and Spitzer proved a general limit theorem for transient random walks in a random environment on Z. We provide a new proof of this limit theorem in the transient subdiffusive regime based on a study of the quenched behavior, i.e. in a given "generic" environment. This different approach enables to make the limit laws fully explicit. Furthermore, it implies a new limit theorem for the quenched distribution of fluctuations. This is joint work with N.Enriquez, C.Sabot and O.Zindy.
Jeffrey Schenker - Michigan State University	Diffusion for Waves in Random Media: Problems and a Results	I will discuss the long time evolution of waves in a homogeneous random environment. Proving that the wave amplitude evolves diffusively over any sufficiently long time scales remains an open problem. One obstacle that arises is recurrence -- return of portions of the wave packet to regions previously visited. Several results will be presented that show that, in a sense, this is the only obstacle. Specifically, it will be shown that if one reduces recurrence by allowing the environment to evolve randomly in time, then diffusion of the wave amplitude can be proved in a relatively simple fashion.

ASSESSMENT OF THE RESULTS AND IMPACT OF THE EVENT ON THE FUTURE DIRECTION OF THE FIELD - LaPietra2011

Due to the large and very diversified participation we can safely state that the LaPietra2011 school-conference in probability was the major event of this type in the field of percolation, particle systems and rigorous statistical mechanics during 2011.

The format allows to have rather detailed presentations of fields where there have been recent developments, and at the same time have some more advanced talks on specific related topics.

The minicourses have been extremely interesting, and, although they were held by very young speakers (two of the four speakers just finishing their Ph.D.) they were extremely well planned and managed to give a clear view of very difficult topics. I think that the participants got the basis and a framework to be able to address the study of one of these three topics if they are interested.
The audience was also very much at the level of interacting with the speakers so that the topics have been presented in a very lively manner. Even senior participants and speakers of the other mini courses attended each class taking notes for future reference.

The afternoon talks presented specific advanced researches, but were mostly connected with teh arguments discussed in the morning classes, so that it became easier to follow and also to get side views and examples to relate to the material of the mini courses.

The short communications gave to some of the young participants to illustrate the content of their work and to get in touch with some more expert researchers. Often short presentations were followed by individual discussions paving the way for improvements and further researches.

The open problems session allowed to illustrate several critical and unclear issues and to collectively discuss some directions for future researches.

The school-conference was also well planned and organized properly: all participants were staying either in the main Villa where also the talks and the lunch were taking place or in Villa across the street. This gave to the participants occasion to meet for scientific and social activities. Various social activities have been planned and this has resulted in a very pleasant occasion also to meet at personal level.

The only aspect that has been felt inadequate by some of the participants has been some lack of time for informal scientific discussions. These were held mostly during breaks or after the afternoon talks, but the richness of the program made it quite difficult to work at the end of the day. In another occasion it will be advisable to plan some time for informal activities like discussions with the speakers of the mini courses or meetings by restricted groups on specific topics.

The large number of participants, their age, their interest and their already advanced preparation indicate that after the occasion offered by the school some of the key problems will be pursued by some of the students and we expect that a number of advances will be generated by the very active group of researchers which gathered in this occasion.

The general impression, also based on discussions with some of the participants, is that it was an exceptional occasion to understand the status of the researches in the areas described by the mini courses, to meet some of the the main actors and to start for new directions.

4th La Pietra week in Probability at Finaly

Seconda scuola GNAMPA di probabilità:
School-conference on Percolation and particle systems.

GNAMPA - INdAM / GLIS - PESC - ESF / PIRE - NSF

SCHEDULE

LaPietra2011	Monday	Tuesday	Wednesday	Thursday	Friday
9:00-10:00	Minicourse 1	Minicourse 1	Minicourse 1	Minicourse 1	Minicourse 1
10:15-10:45	Coffee-break	Coffee-break	Coffee-break	Coffee-break	Coffee-break
10:45-11:45	Minicourse 2	Minicourse 2	Minicourse 2	Minicourse 2	Minicourse 2
12:00-13:00	Minicourse 3	Minicourse 3	Minicourse 3	Minicourse 3	Minicourse 3
13:00-14:30	Lunch	Lunch	Lunch	Lunch	FREE
14:30-15:10	SC M	SC Tu	Open	SC Th	FREE
15:10-15:40	Talk M1	Talk Tu1	problems	Talk Th1	FREE
15:40-16:00	Break	Break	Break	Break	FREE
16:00-16:30	Talk M2	Talk Tu2	Talk W1	Talk Th2	FREE
16:30-17:00	Talk M3	Talk Tu3	Talk W2	Talk Th3	FREE
17:00 -17:30	Talk M4	Talk Tu4	Talk W3	Talk Th4	FREE

Minicourse 1: Beffara - Duminil-Copin
Minicourse 2: Corwin
Minicourse 3: Lubetzky

Short Communications SC M: Ueltschi, Windridge, Bianchi, Belius, Sava, Klimovsky
Talk M1: Richthammer
Talk M2: Toninelli
Talk M3: Bhamidi
Talk M4: Caputo
Short Communications SC Tu: Nacu, Gianfelice, Hilario, Joosten, Cecconi, Tassion
Talk Tu1: Garban
Talk Tu2: Trapman
Talk Tu3: van der Hofstad
Talk Tu4: Nunes Borges de Lima
Talk W1: van den Berg
Talk W2: Dembo
Talk W3: Sidoravicius
Short Communications SC Th: Colomo, Orenstein, Cipriani, Veto, Berger
Talk Th1: Tournier
Talk Th2: Schenker
Talk Th3: Corwin
Talk Th4: Ben Arous

Chairs	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	Gandolfi	Bianchi	van den Berg	van der Hofstad	Ben Arous
Afternoon	Martinelli	Sidoravicius	Newman	Dembo	