Tuesday 23/09

09:00 - 09:40: Alex Dunlap

Title:

Abstract:

09:50 - 10:10: Henri Elad Altman

Title: On a family of singular two-dimensional diffusions in random environment

Abstract: We will present a family of 2-dimensional diffusions appearing naturally to describe the scaling limit of random walks in degenerate random environment. This is based on joint ongoing work with J.-D. Deuschel (TU Berlin).

10:40 - 11:20: Lorenzo Dello Schiavo

Title: Massive particle systems, Wasserstein Brownian Motions, and the Dean–Kawasaki Equation

Abstract: Based on the work *Massive Particle Systems, Wasserstein Brownian Motions, and the Dean-Kawasaki Equation*.

11:30 - 11:50: Łukasz Madry

Title: Ergodicity and uniform in time propagation of chaos for singular fractional SDE

Abstract: We consider the system of interacting particle systems interacting through arbitrarily singular vector field, where particles are equipped with independent realisations of highly volatile fractional Brownian motion. I will present work in progress on the proof of the uniform in time convergence of this system towards the McKean-Vlasov equation as the number of particles goes to infinity. Our method builds up on the techniques used in Hairer 05' to prove existence of the invariant measure of the fractional SDE with the same confining potential and recent progress in the theory of the regularisation by noise. This is joint work with Avi Mayorcas (Bath, UK).

13:30 - 13:50: Johanna Weinberger

Title: Weak Existence and Uniqueness for Super-Brownian Motion with Irregular Drift

Abstract: In this talk, we study continuous random field solutions to the one-dimensional SPDE

$$\partial_t u_t = \frac{1}{2} \quad u_t + h(u_t) + \sqrt{u_t}\dot{W},$$

where $\dot{W}$ is space-time white noise and h is a function satisfying certain structural conditions. These assumptions allow for drift terms that are merely Hölder continuous with exponent $\in (0,1)$, as well as certain discontinuous functions. Our main result establishes weak existence and uniqueness of solutions using the duality method. We extend the classical duality relation of super-Brownian motion by introducing solutions to the log-Laplace equation with multiplicative space-time Lévy noise as the dual process and extending the duality function. The construction of the dual process relies on the theory of initial traces for the parabolic equation

$$\partial_t v_t = \frac{1}{2} \quad v_t \quad \frac{1}{2} v_t^2.$$

A key application of our framework is the case

$$h(x) = \mathbb{1}_{x=0},$$

which highlights differences in the regularizing effects of multiplicative space-time white noise versus multiplicative Brownian motion. Notably, while the SDE

$$dx_t = \mathbb{1}_{x\ =0} dt + \sqrt{x_t} dB_t, \quad x_0 = 0$$

where B is a standard Brownian motion, has no solution, we prove weak well-posedness for the corresponding one-dimensional SPDE. The talk is based on joint work with Leonid Mytnik.

13:55 - 14:15: Francesca Pistolato

Title: Limit theorems for p-domain functionals of stationary Gaussian fields

Abstract: Based on the work *Limit theorems for p-domain functionals of stationary Gaussian fields* and *New limit theorems for fields with a Gneiting covariance functions*, in preparation.

14:20 - 14:40: Grégoire Szymanski

Title: Mean-Field Limits for Nearly Unstable Hawkes Processes

Abstract: Based on the work *Mean-Field Limits for Nearly Unstable Hawkes Processes*.

15:10 - 15:30: Shanshan Hu

Title: Generation of random dynamical systems for McKean—Vlasov SDEs

Abstract: In this talk, we establish random dynamical systems for McKean—Vlasov SDEs, which is a fundamental theory and haven't been proved in the existing literatures. It bridges the gap between stochastic analysis and dynamical systems, leading us to study the McKean—Vlasov SDEs from the view of dynamical systems. In particular, we apply our main result to ensemble Kalman sampler and Landau type equations and prove the random dynamical systems associated with those McKean—Vlasov SDEs.

15:35 - 15:55: Xiaohao Ji

Title: Stochastic Hartree NLS in 3d coming from a Many-Body Quantum System with White Noise Potential

Abstract: Based on the work *Stochastic Hartree NLS in 3d coming from a Many-Body Quantum System with White Noise Potential*.

16:00 - 16:20: Israa Zogheib

Title: Influence of Noise on Dynamic Saddle node bifurcation

Abstract: We investigate the influence of stochastic perturbations on a slow–fast mechanical system modelled by a Van der Pol oscillator coupled to a nonlinear energy sink. By reducing the dynamics near a saddle–node bifurcation, the problem can be approximated by integrated Brownian motion hitting a moving boundary.

We first study the distribution of the hitting time and of the slow variable y at that moment. Then, after analyzing the distribution of y on a single interval, we extend the approach by combining two intervals of the domain. Finally, to obtain a general description of the system's dynamics, we consider several intervals, leading to a more global result on the distribution of y.

Wednesday 24/09

09:00 - 09:40: Sayan Das

Title: Scaling limit of half-space KPZ equation

Abstract: We consider the half-space KPZ (HSKPZ) equation with narrow wedge initial data and Neumann boundary conditions. The half-space version has been of great interest due to the presence of a phase transition (known as the depinning transition) and a rich phase diagram for the limiting distributions, which depends on the strength of the boundary condition. While the scaling limit and its convergence have been studied extensively in the full-space KPZ equation, much less is known in the half-space setting. In this talk, I will discuss the process-level long-time scaling limit of the HSKPZ equation under the 1:2:3 KPZ scaling. This is based on joint work with Christian Serio.

09:50 - 10:10: Francesca Cottini

Title: Directed polymer in space-correlated disorder

Abstract: Directed polymers in random environments describe a perturbation of the simple random walk given by a random disorder (environment). The partition functions of this model have been throughly investigated in recent years, also motivated by their link with the solution of the Stochastic Heat Equation. While classical results focus on space-time independent disorder, we consider a Gaussian environment with (critical) spatial correlations decaying as $|x|$, with critical exponent $= 2$, times a slowly varying function. We show that a phase transition, analogous to that in the space-time independent case, still occurs: in the high temperature regime the log-partition function satisfies a central limit theorem, while it vanishes in law in the low temperature regime. Remarkably, the inverse temperature needs to be tuned differently from the independent case, where the scaling constant $\hat{\beta}$ emerges from a nontrivial multi-scale dependence in the second moment computation — the core technical challenge of the work. Based on a joint work with Clément Cosco (Paris) and Anna Donadini (Milan).

10:40 - 11:20: Giacomo Di Gesu

Title: Asymptotics of the ϕ_4^1 mesaure in the sharp interface limit

Abstract: Based on the work *Asymptotics of the ϕ_4^1 mesaure in the sharp interface limit*.

11:30 - 11:50: Michele Stecconi

Title: Gaussian Nodal Volumes: Definitions, Motivations, and Recent Developments