Abstract:
Branching Brownian motion is a prototype of a disordered system and a toy model for spin glasses and log-correlated fields. It also has an exact duality relation with the FKPP equation, a well-known reaction diffusion equation. In this talk, I will present recent results (obtained with Michel Pain) on the fluctuations of the Gibbs measure at the critical temperature. By Gibbs measure I mean here the measure whose atoms are the positions of the particles, weighted by their Gibbs weight. It is known that this Gibbs measure, after a suitable scaling, converges to a deterministic measure. We prove a non-standard central limit theorem for the integral of a function against the Gibbs measure, for a large class of functions. The possible limits are 1-stable laws with arbitrary asymmetry parameter depending on the function. In particular, the derivative martingale and the usual additive martingale satisfy such a central limit theorem with, respectively, a totally asymmetric and a Cauchy distribution.

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