A SPATIAL BRANCHING MODEL WITH INTERACTION BETWEEN PARTICLES

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Consider the center of mass of a supercritical branching-Brownian motion (BBM). We first show that it is a Brownian motion being slowed down such that it tends to a limiting position almost surely, and that this is also true for a model where BBM is modified by attraction/repulsion between particles.

We then put this observation together with the description of the interacting system as viewed from its center of mass, and get the following asymptotic behavior: the system asymptotically becomes a branching Ornstein-Uhlenbeck process (inward for attraction and outward for repulsion), but (i) the origin is shifted to a random point which has normal distribution, and (ii) the Ornstein-Uhlenbeck particles are not independent but constitute a system with a degree of freedom which is less than their number by precisely one.

The main result then is a scaling limit theorem for the local mass, in the attractive case. A conjecture is stated for the behavior of the local mass in the repulsive case.

We also consider a supercritical super-Brownian motion. Again, it turns out that, conditioned on survival, its center of mass is a continuous process having an a.s. limit.

The talk essentially requires no more background then being familiar with Brownian motion.