

INTERACTING PARTICLE SYSTEMS WITH LONG JUMPS: AN EXAMPLE OF SUPERDIFFUSIVITY

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ABSTRACT. We consider two canonical examples of interacting particle systems: the exclusion process and the zero-range process, on which the transition probability of the underlying random walk has a polynomial decay at infinity. In the absence of finite second moments, scaling limits of these systems are not longer governed by the Laplacian operator, but by an integro-differential operator, for which the fractional Laplacian is a particular case.

We obtain the hydrodynamic limit, density fluctuations and asymptotics of a tagged particle for these systems. In particular, for the exclusion process with long jumps we prove a non-equilibrium CLT for a tagged particle, obtaining by the first time a result of this kind for a system with non-vanishing drift.

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