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Superdiffusive bounds on random walks and diffusions with long memory in the critical dimension

We prove superdiffusivity with multiplicative logarithmic corrections for a class of models of random walks and diffusions with long memory. The family of models includes the “true” (or “myopic”) self-avoiding random walk, self-repelling Durrett-Rogers polymer model and diffusion in the curl-field of (mollified) massless free Gaussian field in 2D. We adapt methods developed in the context of bulk diffusion of ASEP by Landim-Quastel-Salmhofer-Yau (2004).

This is joint work in progress with Benedek Valkó (U Wisconsin, Madison).