Diffusion with Stochastic Resetting

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We study simple diffusion where a particle stochastically resets to its initial position at a constant rate r. A finite resetting rate leads to a nonequilibrium stationary state with non-Gaussian fluctuations for the particle position. We also show that the mean time to find a stationary target by a diffusive searcher is finite and has a minimum value at an optimal resetting rate r^*. Resetting also alters fundamentally the late time decay of the survival probability of a stationary target when there are multiple searchers: while the *typical* survival probability decays exponentially with time, the *average* decays as a power law with an exponent depending continuously on the density of searchers. We also consider various generalisations of this simple model.

† M. R. Evans and S. N. Majumdar, Phys. Rev. Lett. **106**, 160601 (2011); J. Phys. A-Math. & Theor. **44**, 435001 (2011).