Time-autocorrelations for the slicer map and Levy walks in disordered media

J. Vollmer[1], T. Muhammad[1], C. Giberti[2], L. Rondoni[1]

[1]DISMA, Politecnico di Torino, Italy

[2]DISMI, Universita' di Modena e Reggio Emilia, Italy

In a recent paper Salari et al (2015) introduced an analytically solvable model, the slicer map that reproduces the moments of the displacement for the motion of particles in quasi-one-dimensional quenched disordered media, as described in Burioni, et al (2010). Both dynamics exhibit a transition from subdiffusion, over normal diffusion to superdiffusion under parameter variation.
Here, we present the analytical solution of the time autocorrelation function of the slicer dynamics and compare it to numerical results on the motion in quenched disordered media. We establish scaling relations that allow us to elegantly perform this comparison. For a large range of parameters the two models show exactly the same behavior.

[l] L. Salari, L. Rondoni, C. Giberti, and R. Klages, Chaos **25**, 073113 (2015).
[2] R. Burioni, L. Caniparoli, and A. Vezzani, Phys. Rev. E **81**, 060101(R) (2010).