Contribution submission to the conference Dresden 2014

Normal and anomalous fluctuation relations for Gaussian stochastic dynamics — Aleksei V. Chechkin[1], Friedrich Lenz[2], and •Rainer Klages[2] — [1]Inst. f. Theor. Physics, NSC KIPT, Kharkov, Ukraine — [2]Queen Mary U. of London, School of Math. Sci., UK

We study Fluctuation Relations (FRs) for Gaussian stochastic systems exhibiting anomalous diffusion. For this purpose we use a Langevin approach: We first briefly review the concept of transient work FRs for simple Langevin dynamics generating normal diffusion [1]. We then consider two different types of additive, power law correlated Gaussian noise [2]: (1) internal noise with a fluctuation-dissipation relation of the second type (FDR2), and (2) external noise without FDR2. For internal noise we find that FDR2 leads to conventional (normal) forms of transient work FRs. For external noise we obtain various forms of violations of normal FRs, which we call anomalous FRs. We argue that our theory is important for understanding experimental results on fluctuations in systems with long-time correlations, such as glassy dynamics [1].

[1] R.Klages, A.V.Chechkin, P.Dieterich, *Anomalous fluctuation relations*, book chapter in: R.Klages, W.Just, C.Jarzynski (Eds.), *Nonequilibrium Statistical Physics of Small Systems*, Wiley-VCH, Weinheim (2013)

[2] A.V.Chechkin, F.Lenz, R.Klages, J.Stat.Mech. L11001 (2012)

Part: **DY**
Type: **Vortrag;Talk**
Topic: **Anomale Diffusion; Anomalous Diffusion**
Email: **r.klages@qmul.ac.uk**