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# Ageing effects in single particle trajectory averages

### Johannes Schulz, Eli Barkai, Ralf Metzler

### (Submitted on 4 Apr 2012)

We study time averages of single particle trajectories in scale free anomalous diffusion processes, in which the measurement starts at some time t\_a>0 after initiation of the process at the time origin, t=0. Using ageing renewal theory we show that for such non-stationary processes a large class of observables are affected by a unique ageing function, which is independent of boundary conditions or the external forces. We quantify the weakly non-ergodic nature of this process in terms of the distribution of time averages and the ergodicity breaking parameter which both explicitly depend on the ageing time t\_a. Consequences for the interpretation of single particle tracking data are discussed.

Comments: 5 pages, 4 figures Subjects: Statistical Mechanics (cond-mat.stat-mech); Biological Physics (physics.bio-ph); Quantitative Methods (q-bio.QM) Cite as: arXiv:1204.0878 [cond-mat.stat-mech] (or arXiv:1204.0878v1 [cond-mat.stat-mech] for this version)

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