

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Cell motility as a persistent random walk SIMON NORRELYKKE, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany. Department of Molecular Biology, Princeton University, FRANK JULICHER, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany — We study the stochastic properties of trajectories of individual keratocytes that move on a solid substrate. The distribution of observed velocities exhibits a characteristic maximum at finite speed and a local minimum at zero velocity. This velocity distribution depends on the averaging time during which velocities are measured. To characterize the stochastic properties of the system, we determine the correlations between longitudinal and transverse components of the acceleration with the instantaneous velocity. The experimental data can be captured by a simplified physical description of cell locomotion where random forces act on a system of two elastically coupled elements, one of which is driven forward by an active process, dragging the second behind.

Max Planck Institute for the Physics of Complex Systems, Dresden, Germany. Department of Molecular Biology,

Date submitted: 27 Nov 2007

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