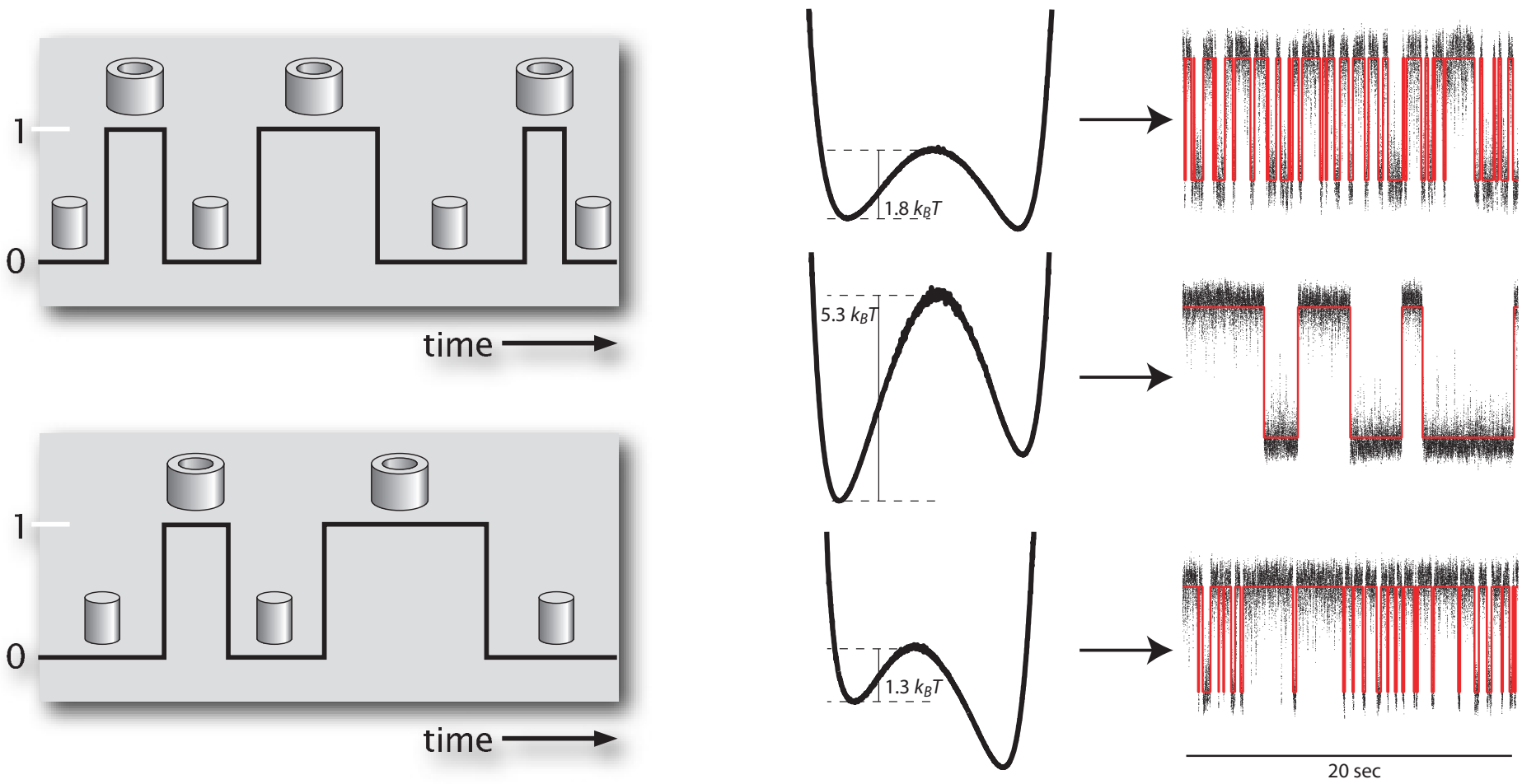
Boston University Physics Colloquium



Small-numbers dynamics in biology and nanotech: the Maximum Caliber approach to nonequilibrium statistical mechanics

The laws of dynamics — Fick's law of diffusion, Fourier's law of heat flow, and the mass-action models of biochemistry, for example — are applicable in bulk solutions where the numbers of particles are macroscopically large. But, inside biological cells, or in applications in nanotechnology, the numbers of particles of a given type is often less than a few hundred. We are interested in the dynamical fluctuations that occur in such cases. To explore small-numbers dynamics, we have explored small-numbers diffusion by microfluidics and single-particle two-state chemistry using laser-trap experiments. We find that the dynamical distributions are well predicted by a trajectory-based approach that ET Jaynes called "Maximum Caliber".

Ken Dill

University of California at San Francisco

September 16, 2008 (Tuesday) at 3:30pm (Refreshments at 3:15pm)
SCI 107, Metcalf Science Center, Boston University

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