سمینار هفتگی گروه ماده چگال نرم

A review of Berezhkovskii and Bezrukov works on

Direction Invariance of the Translocation Time Distribution & Fluctuation Theorem for Membrane Transport

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In this seminar we review 3 of the recent Berezhkovskii and Bezrukov articles on translocation through membrane channels. Describing the particles motion as a continuous-time random walk between neighboring sites, "We prove that the probability density of the translocation time is invariant with respect to the direction of passage. This invariance holds at arbitrary asymmetry of the intra-channel potential, i.e., dependently of how different the translocation probabilities are in the two directions."(A. M. Berezhkovskii and S. M. Bezrukov, J. Phys. Condens. Matter **19**, 065148 (2007)) Then "An exact solution is found for the Laplace transform of the probability $P_n(t)$ that n particles have been transported in time t" (A. M. Berezhkovskii and S. M. Bezrukov, Phys. Rev. Lett, **100**, 038104 (2008)) for strongly repelling particles. And at the end using this and the exact solution of the $P_n(t)$ for noninteracting particles, show that both these particles obey fluctuation theorem: "The ratio $P_n(t)/P_{-n}(t)$ is independent of time and equal to $\exp(n\beta A)$, where βA is the affinity measured in the thermal energy units." (A. M. Berezhkovskii and S. M. Bezrukov, J. Chem. Phys. **112**, 6228 (2008)).

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