

Abstract Submitted
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Stochastic resonance during a polymer translocation process

DEBASISH MONDAL, MURUGAPPAN MUTHUKUMAR, University of Massachusetts Amherst — We study the translocation of a flexible polymer in a confined geometry subjected to a time-periodic external drive to explore stochastic resonance. We describe the equilibrium translocation process in terms of a Fokker-Planck description and use a discrete two-state model to describe the effect of the external driving force on the translocation dynamics. We observe that no stochastic resonance is possible if the associated free-energy barrier is purely entropic in nature. The polymer chain experiences a stochastic resonance effect only in presence of an energy threshold in terms of polymer-pore interaction. Once stochastic resonance is feasible, the chain entropy controls the optimal synchronization conditions significantly.

Debasish Mondal
University of Massachusetts Amherst

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