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Semiflexible Polymer Brushes as Vicious Accelerating Walkers

Abstract

Non-crossing flexible polymer brush configurations with N polymers correspond to N vicious random walkers, i.e. the system stalls when any two random walkers meet. We study a system of N vicious accelerating walkers with the velocity undergoing Gaussian fluctuations, as opposed to the position, to model semiflexibility. We numerically compute the survival probability exponent, α , for this system, which characterizes the probability for any two semiflexible polymers in the brush not to cross. The data suggest that $\alpha = \frac{1}{8}N(N-1)$. We also numerically study N vicious Levy flights and find, for example, for $N = 3$ and a Levy index $\gamma = 1$ that $\alpha = 1.26 \pm 0.01$.