

Average Cycle Period in Asymmetrical Flashing Ratchet

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Abstract: The directed motion of a Brownian particle in a flashing potential with various transition probabilities and waiting times in one of two states is studied. An expression for the average cycle period is proposed and the steady current J of the particle is calculated via Langevin simulation. The results show that the optimal cycle period τ_m , which takes the maximum of J , is shifted to a small value when the transition probability λ from the potential on to the potential off decreases, the maximal current appears in the case of the average waiting time in the potential on being longer than in the potential off, and the direction of current depends on the ratio of the average times waiting in two states.

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Key words: Brownian motor, current, asymmetrical transition

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