Role of translational noise on current reversals of active particles on ratchet

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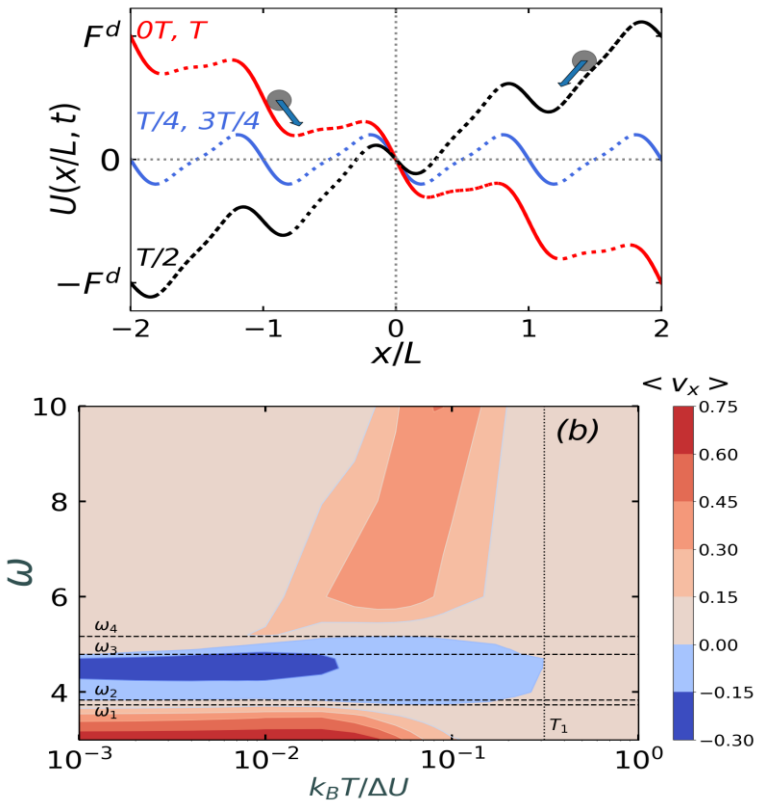

Figure Caption: (top) Pictorial representation of the rocking ratchet, U(x, t) = U(x) − A_d cos(ωt)x) (bottom) Contour plots of average velocity as a function of translation noise k_B T/ΔU and driving frequency ω.

Ratchets are devices which rectify unbiased fluctuations into directed motion by breaking symmetries in the system. Active matter ratchets consisting of 'self-propelled' particles, offer a new class of rectification mechanism which unlike passive driven systems do not require external drive for directed motion. Understanding the transport properties of active entities is of great importance for various biomedical applications such as drug delivery. In this study, we have explored the constructive role of random fluctuations in tuning the magnitude and direction of rectification in driven and isolated active matter systems on an asymmetric periodic substrate.

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