

Stochastic dynamics of molecular motors and filaments

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The stochastic dynamics of molecular motors and filaments is a major driver of important processes in biological cells including transport of cargo, segregation of chromosomes during cell division, and maintenance of the mechanical structure of the cell. Understanding these processes from a physics perspective requires an understanding of the stochastic dynamics, which often occurs on multiple length and time scales. I will illustrate methods to approach these processes based on theoretical models as well as statistical analysis of experimental data. On the one hand, systematic coarse-graining can help to address the dynamics at multiple scales, such as from the chemomechanical cycle of a single molecular motor to active networks of motor-driven filaments. On the other hand, Bayesian inference from experimental data provides a method to reliably extract information from noisy experimental data and to quantify the obtained information or lack thereof.