

Students' Annual Webinar

Active random walks in one and two dimensions

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Active matter, consisting of particles that perform directed motion using ambient energy, is an important class of non-equilibrium systems that has recently been of broad interest. Here, we introduce a simple microscopic model to study the behaviour of active matter at the single-particle level. We study the dynamics of a single active particle on one and two-dimensional infinite lattices which can perform orientational diffusion between lattice directions. We derive exact results for the occupation probability of an arbitrary lattice site as well as the associated large deviation functions. Interestingly, we find that the large deviation function associated with active particle motion displays two regimes with different diffusive behaviours.

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4:00 PM