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Physics of *C. elegans* search[1] MARIA PANLILIO, University of Toronto, FREDERIC BARTUMEUS, Centre for Advanced Studies Blanes, WILLIAM RYU, University of Toronto — Movement is a fundamental feature of life. Organisms must search for prey, avoid predators, or explore new habitats. Using methods from statistical physics we seek to elucidate the behavioral strategies governing *C. elegans* searches and their effects on both ecological and evolutionary timescales. Here we ask: how does the search strategy change under starvation? Animal movement studies are often hindered by difficult observations over large spatiotemporal scales, unknown environmental conditions, and complex behavioral descriptions. *C. elegans* is a powerful model system for overcoming such challenges. Machine vision technologies capture high-resolution images of individuals crawling through a large isotropic environment. Trajectories are reconstructed from the images and behavioral reorientation events are automatically flagged. We find that short-term directional persistence initially increases with time away from food. We also quantify local and global spatial searching scales, which are modulated at least in part by the dynamics of one distinct behavior. Since other reorientation types are known to be suppressed under starvation, we propose that the long-term behavioral strategy acts as a compensatory mechanism to prevent both under and oversampling of the environment.

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