

Abstract Submitted
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Actin Polymerization Driven Mitochondrial Transport in Mating *S. cerevisiae* by Fourier Imaging Correlation Spectroscopy¹ ERIC SENNING, Department of Chemistry, University of Oregon, ANDREW MARCUS, Department of Chemistry, University of Oregon, Eugene, OR 97403 — The dynamic microenvironment of cells depends on macromolecular architecture, equilibrium fluctuations, and non-equilibrium forces generated by cytoskeletal proteins. We studied the influence of these factors on the motions of mitochondria in mating *S. cerevisiae* using Fourier imaging correlation spectroscopy (FICS). Our measurements provide detailed, length scale dependent information about the dynamic behavior of mitochondria. We investigate the influence of the actin cytoskeleton on mitochondrial motion, and make comparisons between conditions in which actin network assembly and disassembly is varied, either by using disruptive pharmacological agents, or mutations that alter the rates of actin polymerization. We find that non-equilibrium forces associated with actin polymerization lead to a 1.5-fold enhancement of the long-time mitochondrial diffusion coefficient, and a transient sub-diffusive temporal scaling of the mean-square displacement. Our results lend support to an existing model in which these forces are directly coupled to mitochondrial membrane surfaces.

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