Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Contributions of microtubule rotation and dynamic instability to kinetochore capture[1] OLIVER SWEEZY-SCHINDLER, CHRISTOPHER EDELMAIER, ROBERT BLACKWELL, MATT GLASER, MEREDITH BETTERTON, University of Colorado Boulder — The capture of lost kinetochores (KCs) by microtubules (MTs) is a crucial part of prometaphase during mitosis. Microtubule dynamic instability has been considered the primary mechanism of KC capture, but recent work discovered that lateral KC attachment to pivoting MTs enabled rapid capture even with significantly reduced MT dynamics. We aim to understand the relative contributions of MT rotational diffusion and dynamic instability to KC capture, as well as KC capture through end-on and/or lateral attachment. Our model consists of rigid MTs and a spherical KC, which are allowed to diffuse inside a spherical nuclear envelope consistent with the geometry of fission yeast. For simplicity, we include a single spindle pole body, which is anchored to the nuclear membrane, and its associated polar MTs. Brownian dynamics treats the diffusion of the MTs and KC and kinetic Monte Carlo models stochastic processes such as dynamic instability.

[1]NSF 1546021

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Date submitted: 15 Nov 2013 Electronic form version 1.4