Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**The implications of microtubule dynamic instability on chromosome dynamics in metaphase** DAVID LUBIN, Department of Medicine, Upstate Medical University, StateUniversity of New York, NY, 13210., BUDDHAPRIYA CHAKRABARTI, ALEX J. LEVINE, Department of Physics, University of Massachusetts, Amherst, MA 01003. — We present a model of chromosome oscillations during late metaphase based on the postulates of the stochastic detachment/reattachment of kinetochore microtubules and the dynamic instability model for microtubules dynamics. In this approach the motion of the chromosomes is analyzed by treating them as Brownian particles subject to a fluctuating force arising from the varying number of microtubules attached to the kinetochore at a given time. Furthermore, we predict observable changes in the chromosome dynamics in response to antimitotic drugs (e.g. taxol) that affects the microtubule dynamics. This approach may facilitate the use of the stochastic time series of chromosome position data as a complement to more traditional approaches in the elucidation of the mechanisms of chromosome alignment during metaphase of cell division.

Buddhapriya Chakrabarti
Department of Physics, University of Massachusetts, Amherst, MA 01003.

Date submitted: 13 Dec 2004 Electronic form version 1.4