Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Glass-like dynamics in the folded state of human interphase chromosome GUANG SHI, Biophysics Program, Institute of Physical Science and Technology, University of Maryland at College Park, MD, USA, CHANGBANG HYEON, School of Computational Sciences, Korea Institute for Advanced Study, Seoul, Republic of Korea, DEVARAJAN THIRUMALAI, Department of Chemistry, University of Texas at Austin, Texas, USA — Genomic DNA in eukaryotes cell is wrapped around nucleosomes and packaged in cell nucleus. Advances in Hi-C and super resolution microscopy have given quantitative information on the folded state of chromosome as well as its dynamics on length scale from several kilo base pairs to hundreds of millions of base pairs. We created a copolymer model to study organization and dynamics of human interphase chromosome. We show that compartments seen in Hi-C experiment is a manifestation of micro-phase separation between active and repressive loci. The dynamics in the package state has all the characteristics of glasses. An indication of glassiness is the crossover from confined diffusion to the subdiffusion in the motion of the chromatin loci. The glassiness of chromosome dynamics provides a balance between stability and mobility on biologically relevant time scale.

Guang Shi
University of Maryland

Date submitted: 11 Nov 2016 Electronic form version 1.4