Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Topological events in single molecules of long genomic DNA confined in nanochannels JEFFREY REIFENBERGER, BioNano Genomics, KEVIN DORFMAN, University of Minnesota, Department of Chemical Engineering and Material Science, HAN CAO, BioNano Genomics — ct- We present a rapid genome-wide analysis method based on new NanoChannel Array technology (Irys^{TM} System) that confines and linearizes extremely long DNA molecules (100 to 1,000 kilobases) for direct image analysis at tens to hundred of gigabases per run. Genomic DNA is stained with YOYO and labeled specifically at the 'GCTCTTC' sequence with fluorescent dyes allowing each molecule to be uniquely patterned and mapped to its corresponding reference. This high-throughput platform automates the imaging of such barcoded patterns on genomic DNA to identify wide spread structural variations in a genome. Here we describe a method to rule out possible topologically altered molecules in linear confinement by identifying possible topological events through a T-test looking for spikes in the fluorescence of the YOYO stained DNA backbone. These events are confirmed through aligning the marked individual molecules to a standard reference and measuring a distance differential between labels surrounding the suspected topological event compared to the reference. Such events could be flagged to distinguish from true structural variations.

Jeffrey Reifenberger
BioNano Genomics

Date submitted: 06 Nov 2013 Electronic form version 1.4