Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Topological Constraints in Directed Polymer Melts ADAM NAHUM[1], Massachusetts Institute of Technology, PABLO SERNA, University of Oxford, GUY BUNIN, Massachusetts Institute of Technology — Polymers in a melt may be subject to topological constraints, as in the example of unlinked polymer rings. How to do statistical mechanics in the presence of such constraints remains a fundamental open problem. We study the effect of topological constraints on a melt of directed polymers, using simulations of a simple quasi-2D model. We find that fixing the global topology of the melt to be trivial drastically changes both the static and dynamic properties. Polymers wander in the transverse direction by a distance which is only logarithmic in their length, and monomers subdiffuse logarithmically slowly. This is in sharp contrast to expectations from existing theories. To cast light on the suppression of the strands' wandering, we also analyse the topological complexity of subregions of the melt, finding it is also logarithmically small. We comment on insights the results give for 3D melts, directed and non-directed.

[1]Membership Pending

Adam Nahum
Massachusetts Institute of Technology

Date submitted: 06 Nov 2015 Electronic form version 1.4