Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Jamming of semiflexible polymers[1] ROBERT S. HOY, Univ of South Florida — We study jamming in model freely rotating polymers as a function of chain length N and bond angle θ_0. The volume fraction at jamming, $\phi_J(\theta_0)$, is minimal for rigid-rod-like chains ($\theta_0 = 0$), and increases monotonically with increasing $\theta_0 \leq \pi/2$. In contrast to flexible polymers, marginally jammed states of freely rotating polymers are highly hypostatic, even when bond and angle constraints are accounted for. Large aspect ratio (small θ_0) chains behave comparably to stiff fibers: resistance to large-scale bending plays a major role in their jamming phenomenology. Low aspect ratio (large θ_0) chains behave more like flexible polymers, but still jam at much lower densities due to the presence of frozen-in 3-body correlations corresponding to the fixed bond angles. Long-chain systems jam at lower ϕ and are more hypostatic at jamming than short-chain systems. Implications of these findings for polymer solidification are discussed.

[1]Support from NSF Grant No. DMR-1555242 is gratefully acknowledged

Robert Hoy
Univ of South Florida

Date submitted: 07 Nov 2016 Electronic form version 1.4