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Viscous Friction of Polymer Brushes AYKUT ERBAS, MICHAEL RUBINSTEIN, University of North Carolina at Chapel Hill, UNC CHEM. POLYMER PHYSICS TEAM — Polymer brushes are unique soft structures that can exhibit solid-like behaviors, i.e., if they are deformed by an external force, they can relax and take their original conformations when the external force is removed. Despite their solid-like character, tribological behavior of polymer brushes exhibits fluid-like properties: For instance, friction force exerted on two interdigitated brushes sheared in opposite directions goes to zero linearly as the shear velocity vanishes, i.e., no static friction occurs, which is a property observed mostly for fluidic friction. In this talk, we present our simulation result and scaling arguments on the friction of planar brush-on-brush systems. Our theoretical approach and simulation regimes encompass both linear and non-linear regimes. We show that individual brush ends move on well-defined average trajectories. The dissipation in the system can be related to these average trajectories for a wide range of shear velocities.

Aykut Erbas
UNC at Chapel Hill

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