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**Spreading of polymer droplets on thin polymer films**

SARA L. CORMIER, JOSHUA D. MCGRAW, KARI DALNOKI-VERESS, Department of Physics & Astronomy and the Brockhouse Institute for Materials Research, McMaster University, Hamilton, ON, Canada, L8S 4M1 — We present experimental results of small ( $r \sim 10 \mu\text{m}$ ) polystyrene droplets spreading on thin polystyrene films. Previous experimental work has extensively explored droplets spreading on various types of solid substrates. However, to our knowledge, micron-sized liquid droplets spreading on the same liquid substrate have not been previously studied due to the difficulty of preparing such a geometry. Initially a glassy droplet is placed atop a glassy thin film and a distinct interface exists, upon heating the interface heals quickly. During spreading we must thus consider not only the flow of the polymer droplet but also that of the supporting film. This droplet-on-liquid geometry is fundamentally different from previous studies and allows us to probe the nanorheology of thin polymer films. We observe a characteristic power law spreading that is dependent on the size of the droplet as well as the height of the substrate film. The preparation and study of such samples provides many opportunities because the droplet and supporting film may be of the same polymer, the same polymer but differing molecular weight, or two different polymers.

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