

Abstract Submitted  
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**Translational Diffusion in a Confined Polymer Melt** JANET WONG, Department of Mechanical Engineering, Imperial College London, LIANG HONG, Dow Chemical Company, SUNG CHUL BAE, STEVE GRANICK, Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign — At the University of Illinois, a new experimental platform has been developed that combines the surface forces apparatus with spatially-resolved fluorescence recovery after photobleaching, giving direct measurements of translational diffusion when polymer melts are confined between mica sheets to controlled thicknesses comparable to the size of the molecules themselves. Applying this platform to polydimethylsiloxane (PDMS), we find not only the anticipated dependence on film thickness but also a dependence on the local pressure: when mica sheets are pressed together so that they flatten, the diffusion of chains confined between them depends on the local pressure, being slowest near the center of the contact. The confined chains split into two populations: those that are immobile on the scale of hours, and those whose mobility is close to that of the unperturbed polymer melt.

Janet Wong  
Department of Mechanical Engineering, Imperial College London

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