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**Fluorescence Recovery after Photobleaching in Confined Polymer Thin Films** LAURA A. G. GRAY, CLIFFORD P. BRANGWYNNE, RODNEY D. PRIESTLEY, Princeton Univ, Dept. of Chemical and Biological Engineering — Over the past twenty years many studies have shown a reduction in the glass transition temperature ( $T_g$ ) of thin polymer films confined on the nanoscale when supported on non-attractive substrates or free-standing. The depth dependence of  $T_g$  has been measured using thin layers of fluorescently tagged polymer to localize the dye within a larger polymer film stack, revealing a decrease in local  $T_g$  tens of nanometers into the film. These results have been explained by the propagation of enhanced mobility from the free-surface into the polymer film. Fewer direct measurements of molecular mobility have been made in confined polymer systems. Here, we present the results of fluorescence recovery after photobleaching (FRAP) experiments investigating the mobility of fluorescently doped and labeled methacrylate-based polymers confined in thin film geometries. Bleaching and recovery was monitored using a laser-scanning confocal microscope that enabled us to bleach arbitrary micron-sized shapes to monitor diffusion in polymer melts.

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