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**Length Scales of Local Glass Transition Temperature Gradients Near Soft and Hard Polymer-Polymer Interfaces** ROMAN BAGLAY, CONNIE ROTH, Dept. of Physics, Emory University — Polymer-polymer interfaces are ubiquitous in polymer blends and block copolymers, while opening up another avenue for the study of interfacial perturbations to the local glass transition temperature Tg(z). We have previously reported the full local Tg(z) profile across a glassy-rubbery polymer interface between polystyrene (PS) and poly(n-butyl methacrylate) (PnBMA), an 80 K difference in bulk Tg [Baglay & Roth, J Chem Phys 2015, 143, 111101]. By using local fluorescence measurements, we revealed how the Tg(z) profile extends hundreds of nanometers away from the interface showing an asymmetric behavior penetrating deeper into the glassy PS side relative to the composition profile. Here, we extend these measurements to investigate how the local Tg profile in PS varies when in contact with a variety of immiscible polymers whose Tgs vary between +90 K and –80 K relative to the bulk Tg of PS, so-called hard vs. soft confinement. The data reveal that the onset of local Tg deviation from bulk in PS occurs at two distinct length scales, which depend on whether PS is the low Tg component (hard confinement) or the high Tg component (soft confinement). In addition, we explore the influence of finite system size on the range of dynamics by the introduction of periodic boundary conditions, as is commonly encountered in computer simulations or block copolymer systems.

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