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Dynamics at a Buried Polymer Interface XUESONG HU, Intense Pulsed Neutron Source, Argonne National Lab., XUESONG JIAO, Dept. of Physics, Northern Illinois Univ., ZHANG JIANG, Dept. of Physics, Univ. of California, San Diego, SURESH NARAYANAN, ALEC SANDY, Advanced Photon Source, Argonne National Lab., SUNIL SINHA, Dept. of Physics, Univ. of California, San Diego, LAURENCE LURIO, Dept. of Physics, Northern Illinois Univ., JYOTSANA LAL, Intense Pulsed Neutron Source, Argonne National Lab. — We present a further development of X-ray Photon Correlation Spectroscopy (XPCS) technique to study polymer interfaces. We have probed capillary wave dynamics not just at a free surface, but also at buried polymer/polymer interface within a bilayer film. The bilayer was chosen so that the critical angle of the top layer is smaller than that of the bottom layer. When X-rays are incident below the critical angle of the top layer, only the structure and dynamics of the top surface are probed. When X-rays are incident above the critical angle of the top layer but below that of the bottom layer, a standing wave is set up. The phase of this standing wave can be adjusted to have a high intensity at the polymer/polymer interface and simultaneously a node at the polymer/air interface. Consequently, one can isolate for the first time the static and dynamic scattering from a single buried layer. Results on a system consisting of a 100nm polystyrene film on top of an 100nm poly(4-bromo styrene) film, supported on a Si substrate will be discussed.

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