

Abstract Submitted
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Grazing Resonant Soft X-ray Scattering: A New Way to See Inside Mesoscale Thin Films ELIOT GANN, ANNE WATSON, NCSU, CHENG WANG, LBNL, JUSTIN COCHRAN, UCSB, JOSHUA CARPENTER, TERRY MCAFEE, HONGPING YAN, NCSU, CHRISTOPHER MCNEILL, Monash University, MICHAEL CHABINYC, UCSB, HARALD ADE, NCSU — Thin film structures are becoming increasingly important in energy and engineering applications as functional films and specifically as thin film electronics. Often the most important structures in these thin films are the interfaces between different materials. The internal structure of thin film complex systems, particularly interfacial structure, has been difficult and often impossible to characterize with traditional characterization techniques. Existing methods either lack materials contrast necessary to distinguish different components, lack penetrating power to see structure beneath the film surface, require special sample preparation which may change important features, or are too local a probe to get statistically meaningful information. This talk highlights a new technique, Grazing Resonant Soft X-ray Scattering (GR-SOXS), capable of probing buried structures in thin film systems. GR-SOXS uses varying energy x-rays near the 1S core electron absorption peak of carbon to scatter from thin polymer films at a grazing angle. Using simulations of the electric field propagation and scattering contrast of different features in model systems as a guide, Scattered X-rays from different structures within the film can be disentangled, elucidating their internal structure.

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