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**X-ray Standing Wave Measurements of Gold Nanoparticles of Varying Sizes Embedded in Polymer Thin Films** ALETA HAGMAN, Northwestern University, Argonne National Laboratory, KENNETH SHULL, Northwestern University, JIN WANG, XUEFA LI, SURESH NARAYANAN, Argonne National Laboratory — Polymer/Metal interactions in a model nanocomposite have been studied with the use of total external reflection x-ray standing waves (TER-XSWs). The TER-XSW technique has been used to measure the diffusive properties of thermally evaporated and colloidal gold nanoparticles buried in polymer thin films (coated on x-ray reflecting mirrors) over distances of nanometers or less. Particle size effects become important for particles that are comparable in size to the smallest possible period of the standing wave, which for a silver mirror is $\sim$ 9 nm. Diffusive motions of colloidal particles with well-controlled sizes can be monitored by appropriately accounting for these size effects.

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