

Rheo-XPCS

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Small-angle x-ray photon correlation spectroscopy (XPCS) accesses dynamics on length scales from nanometers to hundreds of nanometers and time scales from milliseconds to hundreds of seconds that figure prominently in the rheological behavior of complex fluids, and the technique has provided numerous insights into the microscopic origins of the rheology of soft materials. This talk will review recent efforts and discuss future prospects to expand the repertoire of XPCS by using it to probe structural dynamics during *in situ* mechanical deformation and flow. Examples of such rheo-XPCS experiments include those incorporating conventional homogeneous shear deformation, including notably large amplitude oscillatory shear (LAOS), as well as other modes of flow and deformation, such as tensile strain and flow within microfluidic environments. As a specific example, the talk will describe opportunities in such studies to reveal the structural dynamics associated with nonlinear rheological behavior such as yielding in disordered materials.