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**Correlations between Dynamical Heterogeneities and Visco-elastic properties of Confined Colloidal Thin Films** PRASAD SARANGAPANI, Y. ELAINE ZHU, University of Notre Dame, Department of Chemical and Biomolecular Engineering, Notre Dame, IN 46556 — Our recent study on confined hard-sphere colloidal suspensions demonstrates that glass transition can be observed 'sooner' as film thickness approaches a critical value while volume fraction remains constant. In this talk, we present a new study of the rheological properties of strongly confined colloidal thin films by using a home-designed micro-rheometer interfaced with a confocal microscope. We visualize the shear-induced structural relaxation at a single particle level and measure the rheological properties of confined colloidal thin films between two surfaces at narrow gap spacing ranging from 50 $\mu$m to 1-2 $\mu$m. The application of shear excitation greatly accelerates structural relaxation compared to quiescent colloidal fluids and we visualize particle displacements during the "bond breakage" process in strongly confined thin films. Additionally, we characterize their patterns, size and lifetimes under varied shear rates, and correlate their behaviors to the measured visco-elastic and visco-plastic properties of confined colloidal thin films.

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