Simultaneous measurements of bulk moduli and particle dynamics in a sheared colloidal glass

MICHAEL V. MASSA, CHRISTOPH EISENMANN, CHANJOONG KIM, DAVID A. WEITZ, DEAS, Harvard University, Cambridge, MA 02138, USA — We present a novel study of glassy colloidal systems, using a stress-controlled rheometer in conjunction with a confocal microscope. This experimental setup combines the measurement of bulk moduli, using conventional rheology, with the ability to track the motion of individual particles, through confocal microscopy techniques. We explore the response of the system to applied shear, by simultaneously monitoring the macroscopic relaxation and microscopic particle dynamics, under conditions from the quiescent glass to a shear-melted liquid.