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Dynamic Jamming in Granular Polymers LENA LOPATINA, CYNTHIA REICHHARDT, CHARLES REICHHARDT, Los Alamos National Laboratory — We present an extensive study of jamming behavior of two-dimensional granular polymers. In previous work, we showed that the nature of the jamming in granular polymer systems has pronounced differences from the jamming behavior observed for bidisperse two-dimensional disk systems at point J [1,2]. We found that the jamming density decreases with increasing length of the granular chain due to the formation of loop structures, in excellent agreement with experiments [3]. Now we present the response of the granular polymers to shear. At low densities, the system unjams independently of boundary conditions or shear rate. At high densities, for a slip wall the system develops plug flow with velocity equal to shear rate, while for a non-slip wall, the system develops a shear band and finite stress. We show that the stress asymptotes to a value that increases with increasing density and decreases with increasing shear rate. The latter is attributed to shear band changes from wide and migrating at low load to very narrow and localized at high load. [1] C. J. Olson Reichhardt and L. M. Lopatina, Science 326 (5951), 374 (2009). [2] L. M. Lopatina, C. J. Olson Reichhardt, and C. Reichhardt, Phys. Rev. E 84, 011303 (2011). [3] L.-N. Zou et al, Science 326 (5951), 408 (2009).

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