Abstract Submitted
for the NWS18 Meeting of
The American Physical Society

Dynamic Phases, Stratification, Laning, and Pattern Formation for Driven Bidisperse Disks DANIELLE MCDERMOTT, Dept. of Physics, Pacific University, YANG YANG, Dept. of Physics, University of Minnesota, CYNTHIA REICHHARDT, CHARLES REICHHARDT, Theoretical Division, Los Alamos National Lab — Using numerical simulations, we examine the dynamics of driven two-dimensional bidisperse disks flowing over quenched disorder. The system exhibits a series of distinct dynamical phases as a function of applied driving force and packing fraction such as a phase separated state and a smectic state with liquidlike or polycrystalline features depending on the global disk density. At low driving forces, the system exhibits a clogged phase with an isotropic density distribution, while at intermediate driving forces the disks separate into bands of high and low density, where the high density bands can have either liquidlike structure or polycrystalline structure. In addition to the phase separation in the overall density we find that in some cases there is a fractionation of the disk species, particularly for large size ratio differences. These species phase separated regimes are associated with a variety of patterns such as large disks separated by chains of smaller disks or other types of patterns that are affected by the disk size ratio.

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Date submitted: 11 Apr 2018 Electronic form version 1.4