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Jamming, Clogging, and Dynamical Heterogeneities for Vortex Matter in Nanostructured Superconductors CYNTHIA J. OLSON REICHHARDT, CHARLES REICHHARDT, Los Alamos National Laboratory — We show that vortex matter in an asymmetric funnel geometry exhibits a rich variety of dynamical phases, commensurability effects, jamming and clogging behaviors. For vortex flow in the easy direction of the funnel, a series of commensuration peaks appear in the vortex velocity at the matching fields and the overall depinning force increases with increasing vortex density due to jamming of the vortices at the tip of the funnel. For driving in the hard direction, a clogging phase appears in which the flowing vortices organize into a heterogeneous state with a large fraction of the vortices trapped in a small number of funnels, shutting off the flow. Our results should also be relevant for colloids, emulsions, and granular media flowing through funnel geometries.

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