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Dynamic Phase Diagram and Jamming for Driven Dislocation Assemblies CHARLES REICHHARDT, CYNTHIA REICHHARDT, CAIZHI ZHOU, IRENE BEYERLEIN, Los Alamos National Laboratory — By using large scale numerical simulations for driven dislocations in 2D, we show that the resulting dynamic phase diagram has the same features found for driven vortex matter and charge density waves in the presence of random disorder. For low loads the system is pinned or jammed. Just above the onset of motion we observe strong velocity fluctuations with $1/f$ noise properties and bimodal velocity distributions associated with rapidly fluctuating dislocation structures. At higher loads there is a dynamic reordering into a state of partially ordered domain walls with a pronounced drop in the velocity fluctuations as well as a reduction in the noise power. These features have all the hallmarks observed for dynamic phases such as the pinned, fluctuating, and dynamical reordering transitions found in driven vortex matter. We discuss the implications of work in terms of dynamic phase transitions at the onset of motion and the onset of the dynamical ordering.

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