

Abstract Submitted
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Apparent critical scaling for a steady-state sheared glass¹

THOMAS HAXTON, ANDREA LIU, University of Pennsylvania — We conducted simulations of a two-dimensional model glass at nonzero temperature under steady-state shear, and calculated the shear stress and shear viscosity as a function of temperature, shear rate and density. Over a dynamic range of two to three decades, we find excellent collapse of the data using critical scaling of the shear viscosity as a function of the distance from the jamming surface in the parameter space spanned by temperature, shear stress, and density. The shear viscosity can be rescaled to collapse onto a master function of the rescaled stress, where the scale factors are powers of the displacement in parameter space from the critical jamming surface. The master function separates into two branches, a high-temperature or low-density branch that approaches a finite rescaled viscosity at low stress, and a low-temperature or high-density branch that appears to diverge at a finite value of the rescaled stress. These results are consistent with those of Olsson and Teitel[1], who found scaling collapse near the zero-temperature, zero shear-stress jamming transition. We compare our results to mode-coupling calculations of sheared systems. [1] P. Olsson and S. Teitel, Phys. Rev. Lett. 99, 178001 (2007).

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