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Glassy Dynamics in Systems of Ellipse-shaped Particles[1] CARL SCHRECK, Yale University, MITCH MAILMAN, BULBUL CHAKRABORTY, Brandeis University, COREY O'HERN, Yale University — Glass-forming materials possess a critical cooling rate r*; for thermal quench rates r > r*, these systems form disordered solids; for r < r*, they form (poly) crystalline materials. We investigate the influence of particle shape (or anisotropic interactions) on the critical cooling rate. In particular, we perform molecular dynamics (MD) simulations of ellipsoidal particles in 2D as a function of aspect ratio of the major to minor axes to optimize the local packing efficiency and the critical cooling rate to improve glass-forming ability. Also, previous mode-coupling theoretical studies have predicted that over a wide range of aspect ratios, the rotational and translational degrees of freedom undergo dynamical arrest at the same temperature. We will perform MD simulations as a function of the cooling rate, packing fraction, and aspect ratio to determine whether novel glass phases also exist in which the rotational and transitional degrees of freedom freeze at different temperatures.

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