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Properties of fluids under strong confinement: a mode coupling approach SAROJ NANDI, Centre for Condensed Matter Theory, Department of Physics, Indian Institute of Science, Bangalore - 560012, India, SARIKA BHATTACHARYA, Solid State and Structural Chemistry Unit, Indian Institute of Science, Bangalore - 560012, India, SRIRAM RAMASWAMY, Centre for Condensed Matter Theory, Department of Physics, Indian Institute of Science, Bangalore - 560012, India — We extend the mode coupling theory (MCT) of glass transition in bulk fluids to the case of confinement, which enhances the feedback mechanism to drive the system to a glassy state. Confinement enters the theory in terms of an external potential that produces an inhomogeneous density background, which in turn forces the fluid to relax diffusively. Below a certain density, the MCT transition becomes continuous and the critical density of continuous to discontinuous transition depends on the nature of the external potential. If the control parameters are in the proper region of phase space, the fluid shows a three-step relaxation scenario. We also incorporate shear in our theory and thereby show that the fluid, when confined, shows shear thinning at much lower shear rate compared to a bulk fluid.

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