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Role of frictional particle interactions for the jamming of dense suspensions CLAUS HEUSSINGER, Institute for theoretical Physics, University of Goettingen

The jamming paradigm aims at providing a unified view for the elastic and rheological properties of materials as different as foams, emulsions, suspensions or granular media. The usefulness of such a unifying concept hinges on the presence or absence of phenomena that are in some sense universal. One such question is the form of the jamming phase itself. It has long been known that certain suspensions can undergo arrest when driving is strong enough. By way of contrast, standard yield-stress fluids, like dense emulsions, yield when the driving exceeds a threshold. This inversion of the jamming phase diagram can now be linked to the action of frictional forces between the suspended particles. Without frictional forces the material yields and flows at high forces, with friction the material only flows for low forces. As a corollary of this inversion one finds a discontinuous and hysteretic jamming transition as well as continuous and discontinuous shear-thickening regimes.