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Slow dynamics, elasticity and soft jamming of dense suspensions of many arm stars and microgels JIAN YANG, KENNETH SCHWEIZER, Department of Materials Science and Engineering, University of Illinois at Urbana Champaign — The naive mode coupling theory and nonlinear Langevin equation theory of activated dynamics is applied to suspensions of tunable soft repulsive colloids composed of many arm star-polymers and crosslinked microgels. For stars, the volume fraction for the onset of activated dynamics is a non-monotonic function of the number of polymer arms. The barrier for thermally activated hopping grows roughly linearly with arm number, the dynamic fragility decreases as particles become softer, and the shear modulus follows a power law dependence on volume fraction with an apparent exponent that grows with arm number. At very high volume fractions where the stars interpenetrate, the value of the pair correlation function near contact goes through a maximum, the activation barrier saturates, and the modulus becomes a linear function of concentration. This dramatic "soft jamming" crossover bears some similarity to jamming phenomena in fluids of crosslinked microgels but with distinctive differences due to the formation of overlapping clusters in star suspensions.

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