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Effect of Inertial Mass on Velocity Correlations of Shear Driven Soft-Core Disks Approaching the Athermal Jamming Transition[1] DANIEL VÅGBERG, PETER OLSSON, Umeå University, 90187 Umeå, Sweden, STEPHEN TEITEL, University of Rochester, Rochester, NY 14627 — It was found numerically that overdamped, frictionless, soft-core disks undergoing uniform shear driven flow, show differences in behavior depending on how the viscous dissipation is introduced into the numerical simulation. When dissipation is with respect to a sheared external reservoir (the so-called "mean-field" approximation), velocity correlations are found to determine a finite length scale ξ that diverges as the jamming transition is approached[1]. However, when dissipation is modeled by inter-particle inelastic collisions, the velocity correlations show no characteristic length other than the length of the system[2]. To study the relation between these two models of dissipation, we remove the overdamped constraint and consider particles with finite inertial mass m, and study how velocity correlations behave as the overdamped limit $m \to 0$ is approached.

[1] P. Olsson and S. Teitel, Phys. Rev. Lett. **99**, 178001 (2007).
[2] B. P. Tighe et al. Phys. Rev. Lett. **105**, 088303 (2010).

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