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The evolution of orientational order in sheared, 2D granular media of convex and concave elongated particles[1] THEODORE MARSCHALL, STEPHEN TEITEL, Univ of Rochester — We simulate granular media consisting of elongated grains in two dimensions with a uniform background shear. We study the orientational distribution and rotation over a wide range of packing fractions, and find that the distribution reaches a stable steady-state under most initial conditions. The nematic director increases with the packing fraction, but the nematic order parameter exhibits non-monotonic behavior, which occurs well below jamming. We observe the evolution of the orientational distribution starting from configurations with the director out of alignment from its steady state orientation, and the evolution of highly ordered initial states. In general, the tumbling motion caused by the background shear causes such systems to reorder into the steady-state, but some dense, highly-ordered configurations maintain their order and exhibit wagging behavior. This can occur both above and below the jamming transition. These results for smooth, convex, spherocylindrical particles are contrasted with those for concave cross-like particles.

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