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Shear reversal in granular flows MASAHIRO TOIYA, University of Maryland, WOLFGANG LOSERT, University of Maryland — The reversal of the shear direction in flow of monodisperse and bidisperse granular matter in a shear cell of Taylor-Couette type is characterized experimentally. By changing the boundary conditions we tune the location and width of the shear band in steady state flow. When the shear direction is reversed, the system compacts over a characteristic length of half a particle diameter, and shear forces reach a steady state over a chacteristic length of 1-3 particle diameter. A linear strain is found at the onset of shear reversal before a steady state shear band develops. We associate this extra strain during shear reversal with the displacement needed to jam particles in regions away from the shearband. We find that the strain decreases with increasing particle size for a fixed system size. We also find radial components in average particle velocities at the top surface, suggesting a convection current in the bulk.

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