Supplemental Material:

The supplement contains four movies that show the full time evolution (movies M1 and M2) and a stroboscopic representation (movies M3 and M4) for different shear rates Γ_s at an interaction strength $\Gamma_i = 0.1$.

The simulated particles are shown in red and their periodic images in gray. The fundamental domain contains 100 particles, and the aspect ratio L_y/L_x equals $\sqrt{3}/2$.

M1 & M2:

The top left panel shows the actual shearing and particle motion in time, the bottom panel shows the stroboscopic positions. The upper right panel shows the average displacement per particle over one period. The videos start after 100 periods (t=100), and run over 10 periods.

M1: low shear rate, $\Gamma_s = 8.0$; the system is in the reversible regime, with particles slowly relaxing towards an ordered state. At t=100, the system has not settled yet, and some defects are encountered which slowly grow out.

M2: high shear rate, $\Gamma_s = 16.0$; the system is in the irreversible regime, and particles constantly experience large, random displacements. At t=100, the system has attained its asymptotic, chaotic state.

M3 & M4:

Magnified view of the stroboscopic images over longer periods. The movies start after 2500 periods (t=2500), and run for 500 periods. Each particle carries a grayscale tail, indicating its position over the last 10 periods.

M3: low shear rate, $\Gamma_s = 8.0$; we observe a large scale reorganization in the right part of the domain before the system reaches its final state, a hexagonal lattice configuration.

M4: high shear rate, $\Gamma_s = 16.0$; particles are displaced strongly over one period. The tails indicate that motion parallel to the shear is enhanced

M1: `M1_shear_low.mp4`
M2: `M2_shear_high.mp4`
M3: `M3_strob_low.mp4`
M4: `M4_strob_high.mp4`