Figure 3: Snapshots of the sedimentation of 6270 disks of diameter 10/192 cm in 2D ($W = 10$ cm). The initial lattice is hexagonal.

tested 80 rows cases in a 2D box of width 10 cm and height 12 cm with diameters varying from 10/192 cm to 16/192 cm.

In hexagonal cases there are 6270 disks staggered at the top of the box (see Figure 3(a)). There are 60 rows and in each row there are either 104 or 105 disks. The width and the height of the box are 10 cm and 12 cm respectively. The diameter of disks varies from 10/192 cm to 16/192 cm. In Figure 3(b), the snapshot of the sedimentation of 6270 disks of diameter 10/192 cm in a 2D box is shown.

In rectangular cases, there are 80 columns at the top of the box. We tested two sets of cases in which the number of rows is either 60 or 80 in order to probe the effect of the number of rows. The diameter of disks varies from 10/192 cm to 16/192 cm. In Figure 4, there are snapshots of the sedimentation of 4800 and 6400 disks of diameter either 10/192 cm or 16/192 cm in a 2D box.

In all simulations the averaged particle Reynolds number at each time step is less than 3. The maximal individual particle Reynolds number among all simulations is about 11. In each case, simulation gives rise to fingering which resembles Rayleigh-Taylor instabilities (Figures 2, 3, and 4). The waves have a well defined wavelength and growth rate which we shall model as a conventional Rayleigh-Taylor instability of heavy fluid above light. The