Jamming transition of two-dimensional monodisperse soft particles[1] WEN ZHENG, NING XU, University of Science and Tech of China — By finding local minima of a thermodynamic-like potential, we genarate jammed packing of monodisperse frictionless circular disks under constant pressure in two dimensions. Contrast to the bidisperse systems, the packing of monodisperse systems display a wide distribution of packing fractions even the pressure close to zero, so that essentially all configurations are the coexistence of amorphous solid and triangular lattice in the thermodynamic limit. Moreover, both the local packing fractions and density of vibrational states (DOVS) demonstrate that jamming physics dominated the behaviour of amorphous solid constituent in two dimensional monodisperse system, and the local packing fraction of jamming transition corresponds to the previously meaured value for random close packing $\varphi =0.84$. In fact, our results provide a well-difined meaning for "random close packing" in two dimensional monodisperse systems. We also obtain numerical estimates of the random close packing density, which provides new insights into the mathematical problem of packing spheres in large dimensions.

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Date submitted: 29 Nov 2016   Electronic form version 1.4