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The jamming transition and beyond: Density dependence of the relevant length and time scales in a horizontally vibrated granular monolayer FREDERIC LECHENAULT, OLIVIER DAUCHOT, CEA, INSTABILITY AND TURBULENCE GROUP TEAM — A dense amorphous monolayer of hard disks is horizontally driven by a glass plate oscillating underneath while confined in a fixed rectangular cell. As the packing fraction is decreased, the system exhibits a transition between a totally jammed state in which the pressure is driven by the contact network and a "supercooled" regime in which the kinetic contribution becomes dominant. We characterize the diffusion properties of such packing across the transition. Furthermore, we compute the self- intermediate scattering function $F_s(\tau, \mathbf{k})$ and the so- called dynamical susceptibility $\chi_4(\tau, \mathbf{k})$. First we show that the former scales with the diffusive length. Then we find that the cooperative scale associated to the latter increases as the packing is increased toward the transition and then drops abruptly as a certain critical density ϕ_c is crossed. Finally we uncover a relationship between F_s and χ_4 and discuss its link with a dynamical fluctuation dissipation relation.

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