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Pressure Distribution and Critical Exponent in Statically Jammed and Shear-Driven Frictionless Disks

STEPHEN TEITEL, Univ of Rochester, DANIEL VAGBERG, Umeå University, YEGANG WU, Univ of Rochester, PETER OLSSON, Umeå University — We numerically study the distributions of global pressure that are found in ensembles of statically jammed and quasistatically sheared systems of bidisperse, frictionless, disks at fixed packing fraction $\phi$ in two dimensions. We use these distributions to address the question of how pressure increases as $\phi$ increases above the jamming point $\phi_J$, $p \sim |\phi - \phi_J|^y$. For statically jammed ensembles, our results are consistent with the exponent $y$ being simply related to the power law of the interparticle soft-core interaction. For sheared systems, however, the value of $y$ is consistent with a non-trivial value, as found previously in rheological simulations.

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