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LONG RANGE BOUNDARY EFFECT IN THE GRANULAR GAS IN MICRO-GRAVITY FOR EVENT-DRIVEN SIMULATION

Abstract

We present the results from event-driven simulation of a two-dimensional (x, y) granular gas excited by vibrated its boundary in a given direction (O_y). We calculate the local pressure tensor at different position and in the directions perpendicular and parallel to the driving wall. Without the macroscopic velocity field, we still investigate the pressure tensor field instead of one direction pressure. The results prove first, that the diagonal elements of the "pressure" tensor are anisotropy $p_{xx} \neq p_{yy}$. Further, they show also that, the positive and negative components of pressure($p_{yy}^{+} \neq p_{yy}^{-}$) in the driven direction (O_y) are different in most of the sample, which demonstrate a breaking of symmetry of the distribution of speed distribution in y direction : $pdf(v_y^{+}) \neq pdf(v_y^{-})$ at a position y . At last, the non- diagonal elements of pressure tensor are also not uniformity and not zero. These results imply the Navier-Stokes modeling cannot be used safely and as to be re-examined carefully before being used in inelastic granular matter.