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Granular Flow in Narrow Channels K.M. HILL, S.A. MCGOUGH, J. ZHANG, Dept. of Theoretical and Applied Mechanics, University of Illinois — We experimentally investigate the effect of channel thickness on monodisperse spherical particles in thin drums of different widths. We find the velocities and velocity fluctuations to be strongly dependent on the width of the drum, but that relationship is not monotonic. As the ratio of the drum width to particle diameter increases, the velocity and velocity fluctuations oscillate, and the amplitude of oscillations decrease as the width of the drum increases. This phenomenon appears to be governed by the level of disorder in the allowed packing structure. That is, the velocities and velocity fluctuations are maximized where the drum widths forces a more disordered packing and minimized for drum widths where, for example, hexagonal close packing is allowed. Measurements of the pair correlation function also indicate that the particles are hexagonally packed in planes parallel to the sidewalls for drum widths where the velocities are slowest, and that the packing is more disordered for widths where the velocities are faster.

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