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Space-Time Structure of Granular Flows in a Rough Vertical Channel[1] DONALD CANDELA, KEVIN FACTO, University of Massachusetts Amherst — We report measurements using PFG-NMR of the space and time structure of steady granular flows through a long vertical channel of circular cross section with roughened walls. The granular sample consisted of seeds approximately 400 μm in diameter, flowing through a 9.8 mm ID tube to which was adhered a monolayer of glass beads similar in diameter to the grains. Data was acquired from a region approximately 50 channel diameters higher than the aperture at the channel bottom used to control the flow rate. The mean velocity of the grains as well as the RMS fluctuations in the grain motion were measured as functions of the radial coordinate and for time intervals in the range 5-200 ms, for several different granular flow speeds. For some flow regimes the displacement distributions are distinctly non-Gaussian, at odds with a "molecular fluid" model of the granular medium. The time dependence of the fluctuation distribution provides clues to the mechanism by which the gravitational body force is transmitted to the channel walls.

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