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The Liquid Nature of a Granular Jet Hitting a Fixed Target XIANG CHENG, GERMAN VARAS, DANIEL CITRON, HEINRICH JAEGER, SIDNEY NAGEL, James Franck Institute and Department of Physics, University of Chicago — We perform the granular analog to the 'water bell' experiment [1]. A column of dry spherical glass beads is accelerated by pressurized air through a glass tube to form a high-speed granular jet. When this jet collides with a stationary target disc, we observe the formation of granular sheets and cones enveloping the target similar to those seen when water jets hit a target and subsequently form water bells. The opening angle of the cones is measured as a function of the speed and diameter of the initial granular column and the diameter of the target disc. Under these conditions, dry granular material behaves similarly to a fluid with zero surface tension, i.e., a fluid with infinite Weber number. By decreasing the flux and increasing the size of the granular particles, we observe that the structure formed by the jet becomes more diffuse and the dynamics changes as the particulate nature of the material becomes more apparent. Furthermore, we measure the force impulse exerted on the target during the collision and relate it to the granular ripples formed on the thin ejected granular sheet. [1] C. Clanet, J. Fluid Mech. 430, 111 (2001).

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