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High-speed granular flows around a cylindrical obstacle JOSHUA S. CAPLAN, STUART B. DALZIEL, University of Cambridge, JIM N. MCELWAIN, University of Durham, NATHALIE M. VRIEND, University of Cambridge — Geophysical granular flows are extremely destructive, but their behavior when they impact on obstacles in their path is still poorly understood. In this talk we will present the results of a series of experiments where we consider the granular flow around a cylindrical obstacle, extending previous work by Cui and Gray (2013). By using a unique recirculating chute, we are able to consider flows of up to 20 kg s^{-1} at speeds of several meters per second. This gives us access to flow regimes that could not be previously considered. As has been previously observed, we find a large bow shock ahead of the obstacle and a granular vacuum behind it. We, however, find that the shock shapes are significantly different to previous observations. We will also be presenting PIV measurements of the surface velocity, height profiles of the flow, and measurements of the forces on the obstacle.

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