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Simulations of granular jet impact deadzone formation NICHOLAS GUTTENBERG, JAKE ELLOWITZ, WENDY ZHANG, University of Chicago, HERVE TURLIER, Univ. Pierre & Marie Curie, SIDNEY NAGEL, University of Chicago — Motivated by granular experiments showing the emergence of continuum-like dynamics when a dense jet hits a target, we simulate the impact of 2D and 3D granular jets of frictional, cohesion-less grains upon a fixed target. This is a inertial, dense jet regime where the motion is essentially incompressible. Impact deflects the material in the jet into a hollow conical sheet. The cone angles measured in simulation are consistent with previous experimental studies of the 3D granular jet impact. In addition, experiments have revealed the formation of a "dead zone," a region where the grain motion is negligibly small. The simulation shows that this dead zone can only form when a no-slip boundary condition is enforced at the target. The presence or absence of the dead zone leads to a change in cone angle consistent with the experimentally observed differences in cone angle between the 3D granular flow and the corresponding water bell flow.

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