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A lot of information on impacts of solid bodies on planets has been extracted from remote observations of impact craters on planetary surfaces; experiments however with large enough impact energies as compared to the energy stored in the ground are difficult. We approach this problem by downscaled experiments and by corresponding discrete particle numerical simulations: The idea is to fully decompactify very fine sand which then at impact of a steel ball behaves fluid-like. The series of events is as follows: On impact of the ball, sand is blown away in all directions (“splash”) and an impact crater forms. When this cavity collapses, a granular jet emerges and is driven straight into the air. A second jet goes downwards into the air bubble entrained during the process, thus pushing surface material deep into the ground. The entrained air bubble rises slowly towards the surface, causing a granular eruption. In addition to the experiments and discrete particle simulations, we present a simple continuum theory to account for the void collapse leading to the formation of the upward and downward jets. We show that the phenomenon is robust and even works for oblique impacts: the upward jet is then shooting backwards, in the direction where the projectile came from.

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