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Morphology and Scaling of Impact Craters in Granular Media

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We study the size and morphology of impact craters formed when a steel ball is dropped into a container of small glass beads [1]. We find that both the depth (measured from the original surface) and diameter of the crater are proportional to the 1/4 power of energy. This is as expected if the energy of impact goes into excavating the crater and material strength is unimportant. We observe a variety of crater morphologies as a function of impact energy and grain size: simple craters, craters with a central peak, craters with slump terraces around the perimeter, and multi-ringed craters. The progression of these changes in morphology is similar to that observed in lunar craters.
1. A.M. Walsh, K. Holloway, P. Habdas, and J.R. de Bruyn, Phys. Rev. Lett. 91, 104301 (2003).

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