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Granular Dynamics during Impact[1] KERSTIN NORDSTROM, University of Maryland, EMILY LIM, Duke University, MATT HARRINGTON, WOLFGANG LOSERT, University of Maryland — In this work, we study the impact of a projectile onto a bed of 3 mm grains immersed in an index-matched fluid. Using a laser sheet scanning technique, a high speed camera, and particle tracking, we can measure the trajectory of each grain throughout an impact event. We characterize the bulk and microscopic dynamics within the granular material as a function of initial sample preparation, specifically applying a uniaxial prestrain to the sample. We find that small changes in sample preparation lead to drastic departures from the universal depth scaling seen in previous studies of shallow granular impacts. By examining the nonaffine motion within the system, we propose the effect is due to different loading and buckling of force chains within the system.

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