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Impact Dynamics in a 3D Granular Bed[1] KERSTIN NORDSTROM, MATT HARRINGTON, WOLFGANG LOSERT, University of Maryland — Granular impacts have been studied for many years in the scientific community. Force laws have been characterized for different systems including universal scaling relations by Katsuragi and Durian. Despite this, little is known regarding the microscopic origin of these observations. 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 have characterized the nonaffine motion within the system as a function of projectile shape and initial sample preparation. Our preliminary results show significant nonaffine motion near the impactor. These results are compared and contrasted with recent experiments and simulations involving 2D systems.

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