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The effect of grain-scale properties on ballistic penetration into sand JAMES PERRY, CHRIS BRAITHWAITE, NICK TAYLOR, ANDREW JARDINE, University of Cambridge — The dynamics of granular materials depend on the complex network of inter-grain force chains, but a coherent understanding of the effects of grain-scale properties (morphology, moisture) and loading conditions (rate, geometry) is still lacking. Here, we impact cylindrical targets with spherical projectiles and employ Digital Speckle Radiography to determine both penetration depth and sand bed displacement during impact. We compare several similar silica sands under dry and moist conditions, and illustrate how and why very small variations in material properties can dramatically alter the stopping power of a granular bed.

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