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Exploring penetration through granular media DANIEL J. COSTANTINO, Department of Physics; Pennsylvania State University, THOMAS J. SCHEIDEMANTEL, MATTHEW B. STONE, JULIA COLE, CASEY CONGER, KIT KLEIN, MATTHEW LOHR, WILLIAM MCCONVILLE, ZACHARY MODIG, KRYSTEN SCHEIDLER, PETER SCHIFFER — The motion of objects through granular media is an important physical problem involving local jamming of the grains. We report on an experiment dealing with the force needed to initiate upward motion through a granular pile, F_{ini}. As expected, this force scales monotonically with the depth of the intruder as well as its size, D_{plate}. However, unlike previous experiments this force also depends on the size of the particles making up the pile, d_{grain}. The force can be represented by the function $F_{ini} = AD_{plate} \quad d_{grain} + BD_{plate}^2$; which can be qualitatively explained within a simple model. Finally, preliminary results from a new experiment dealing with horizontal motion through a granular pile will be discussed. In this study, the effect of interstitial fluids on a granular material's resistance to an intruder will be investigated. Research supported by NASA grant NAG3-2384 and the NSF REU program.

Daniel J. Costantino
Department of Physics; Pennsylvania State University

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