Abstract Submitted
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Changes in the Distribution of Avalanches on a Conical Bead Pile with Cohesion[1] JUSTINE WALKER, SUSAN LEHMAN, College of Wooster, KARIN DAHMEN, MICHAEL LEBLANC, University of Illinois at Urbana-Champaign, JONATHAN UHL, Retired — The probability distributions for avalanches of varying size are experimentally determined for a slowly driven, conical bead pile. The pile is composed of roughly 20 000 steel spheres, 3 mm in diameter, atop a circular base; it is driven by adding one bead at a time to the apex of the pile. We investigate the dynamic response of the pile by recording avalanches off the pile over the course of tens of thousands of bead drops. The avalanching behavior is studied at different drop heights and different amounts of cohesion between the beads. The level of cohesion is tuned through use of an applied uniform magnetic field. Smaller, local avalanches are distinguished from larger, non-local avalanches and the moments of the avalanche distribution are calculated separately for these different populations. The resulting moments scale with cohesion differently, and the results are compared to the scaling predictions from an analytic mean-field model and corresponding simulation of slip avalanches in a shear system [Dahmen, Nat Phys 7, 554 (2011)].

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