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Scaling Analysis And Tuning Parameters For Avalanches On A Slowly-Driven Conical Bead Pile SUSAN LEHMAN, LILIANNA CHRISTMAN, PAROMA PALCHOUDHURI, D.T. JACOBS, Department of Physics, The College of Wooster, Wooster, OH — We report the results of our investigation of the dynamic behavior of a 3D conical beadpile composed of 3 mm steel beads. Beads are added to the pile by dropping them onto the apex one at a time; avalanches are measured through changes in pile mass. We have previously shown that the avalanche size distribution generally follows a power law relation for beads dropped onto the pile apex from a low drop height; for higher drop heights or beads dropped over a larger region, the distribution deviates from a power law due to a reduction in the number of larger avalanches. We are now tuning the critical behavior of the system through the addition of cohesion from a uniform magnetic field, and we find an increase in the probability of very large avalanches and decreases in the mid-size avalanches. Similar distributions have been observed previously by other researchers in conical piles of sand, suggesting a possibility that cohesion may have been a factor. All our distributions without cohesion show universality by collapsing onto a common curve in a scaling analysis; so far no scaling has been found in the system with cohesion. The distribution of the time between avalanche events of various size has also been analyzed and shown to depend on both drop height and cohesion strength.

Susan Lehman
Department of Physics, The College of Wooster, Wooster, OH

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