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Improving detection of avalanches on a conical bead pile[1] AVI VAJPEYI, SUSAN LEHMAN, College of Wooster, KARIN DAHMEN, MICHAEL LEBLANC, University of Illinois at Urbana-Champaign, JONATHAN UHL, Retired — A conical bead pile subject to slow driving and an external magnetic field is used as a simple system to investigate the variations in the avalanche size probability distribution function. Steel beads are dropped onto the pile from different heights and at different strengths of applied magnetic field. Avalanches are recorded by the change in mass as beads fall off the pile. Experimentally we observe an increasing deviation from power law behavior as the field and thus cohesion between the beads increases. We compare our experimental results for the probability distribution function to the results of an analytic theory from a mean-field model of slip avalanches [Dahmen, Nat Phys 7, 554 (2011)]. The model also makes predictions for avalanche duration, which is not measurable with the existing system. To more fully characterize the avalanching behavior of the pile over time, a high-speed camera has been added to the system to record the largest avalanches and allow more detailed analysis. The conical pile geometry presents a challenge for observation and particle tracking over the full pile. Our implementation scheme and preliminary results from the video analysis are presented.

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