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**Probing Avalanche Dynamics using Speckle-Visibility Spectroscopy.** ADAM ABATE, HIROAKI KATSURAGI, DOUG DURIAN, University of Pennsylvania, Department of Physics and Astronomy — We apply a new light scattering technique called Speckle-Visibility Spectroscopy to the study of avalanches. By directly relating the rate of change of the scattered speckle pattern to the fluctuation dynamics of the flowing sand particles, we attain a precision of 0.1 mm/s. Running for 35 hours at 58 kHz, we simultaneously observe the microscopic short-time fluctuations of the sand particles and the long time behavior of thousands of avalanche events, and thus report avalanche frequency statistics and average shape. Interestingly, while all avalanches turn on in 0.3 s and in a similar way, there is a wide variation in how avalanches turn off. The fluctuation speed reaches a maximum just after the avalanche begins, it remains constant for a while, and then decays to zero. Power spectra of the full data set show that as avalanches slow the dynamics are self-similar ($\sim 1/f^2$) and the normalized variance of different events diverge at the turning off time.

Adam Abate
University of Pennsylvania, Department of Physics and Astronomy

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