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Slip avalanches in granular systems under shear DMITRY DENISOV, University of Amsterdam, KARIN DAHMEN, University of Illinois at Urbana Champaign, PETER SCHALL, University of Amsterdam — We study the evolution of slowly sheared granular systems deforming via discrete strain bursts (slips). The granular sample consisting of 10^5 hard spheres (mm-size) is subjected to applied shear and studied with the combination of two techniques – precise stress-strain measurements and laser sheet imaging. Fluctuations in the stress-strain profile correspond to internal slip avalanches leading abrupt reconstructions in the system due to the shear. The magnitude of the fluctuations is taken as the size of the avalanche events. The power-law distribution of the slip sizes signifies the existence of the dynamically critical state in granular samples under the shear. Laser sheet imaging allows us to visualize each individual slip event, estimate its spatial distribution together with local strain change and connect it to the global fluctuation in the stress-strain curve. Such unique combination of the techniques and analysis lead us to comprehensive understanding of slip avalanches.

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