Abstract Submitted
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**Stick-Slip and Granular Force Networks**[1] ROBERT BEHRINGER, PEIDONG YU, Duke University — We describe friction/failure experiments for a granular system consisting of photoelastic particles. The goal of the experiments is to provide a microscopic understanding of stick-slip friction for an object that is pulled across a granular material. The granular material consists of a photoelastic disks (bidisperse distribution) that are confined to a vertically oriented channel. A slider that is rough at the grain scale is pulled across the upper surface of the material. The pulling is accomplished by a screw-driven platform that is connected to the slider by a spring. Photoelastic image data are acquired by a camera and light source that move with the platform. Non-periodic stick-slip occurs for the regime of parameters studied here. During a stick event, force builds up in a strong network of force chains in the granular material. When one or more of the chains break, a slip event occurs. Energy changes from these events are power-law distributed. Analysis of failure points and slip events yields the effective friction coefficients, which are broadly scattered. An alternative description involves modeling the force chain network as a collection of springs. Failure of one spring can lead to a cascade and hence the broad distribution of energy losses.

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