Acoustic wave probing of a sheared granular layer during stick-slip

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ABSTRACT

Stick-slip dynamics in a sheared granular layer of glass beads is simulated using 3D Discrete Element method (with Hertz-Mindlin contact forces). The granular layer, subject to a normal stress, is sheared between two rough walls.
We investigate the granular layer at specific times in a stick-slip event by probing it under resonance conditions applying compressional and shear waves. Grain-scale quantities (slipping contact ratio, coordination number, wave velocity) are computed and compared to the results of laboratory measurements. In this manner we characterize the elastic properties of the granular layer throughout the evolution of the stick-slip cycle.

REFERENCES

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