

Jamming and convection in granulates

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Granular media changes its properties drastically when going through the jamming transition. Technical applications of this transition, usually consist of a granulate that is enclosed by a membrane. The jamming transition can then be achieved by applying a pressure on the membrane, such that the granulate is compressed. Two such applications are granular grippers and granular metamaterials. To simulate these, I present a method which makes it possible to simulate membranes together with a granulate using DEM. I use this method to characterize and improve both applications.

In addition to jamming, I deal with granulates in vibrated cylinders under zero gravity conditions. The vibrations cause convection, which despite the absence of gravity does not necessarily have an axis of symmetry perpendicular to the direction of the vibration. In my work, I show two such convection patterns and explain why they occur.

