

Granular Assemblies in quasi-static biaxial Compression Tests

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Granular packings (sand, rocks, ...) are submitted to constant or slowly increasing external forces at the set of boundaries. Along one direction, the forces are increased quasi-statically until the packing 'fails', i.e. the structure becomes unstable and the grains suddenly rearrange. What happens at failure? Some regions become "liquid", allowing the particles to flow. Hence failure might be an example of a (un)jamming transition and its characteristics may therefore be compared with those of the glass transition.

The ultimate goal is to determine the precursors of failure and to identify a diverging length scale. One point of interest is the contact structure: We determine the total number of contacts and the number of contacts at which the particles slide, as these two values are important for stability. Furthermore we pay special attention to contact changes (lost and new contacts), which become more frequent and organize when failure is approached. Prior to failure, we detect local instabilities in some regions, and we calculate the induced force imbalance.