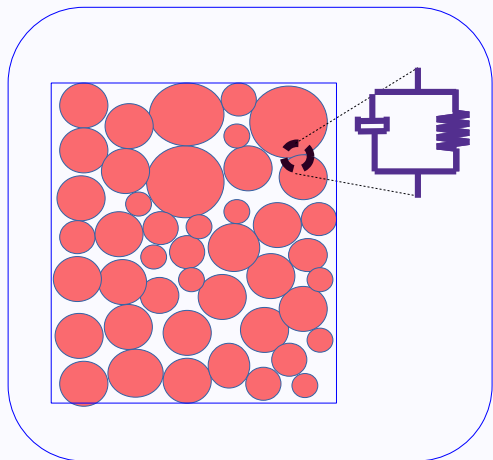


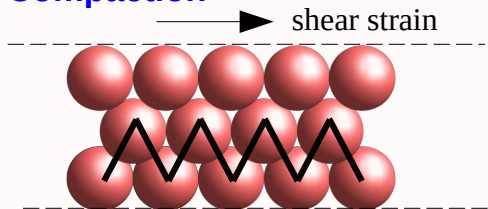
## (a) Microscale



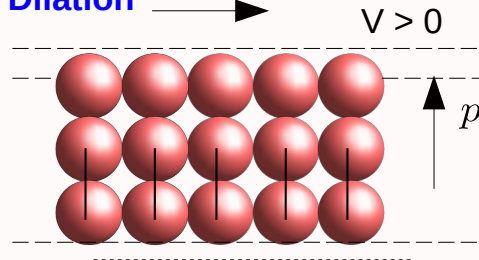
Interparticle-micromechanism  
**Material properties and  
initial state**

## (b) Mesoscale

### (i) Compaction



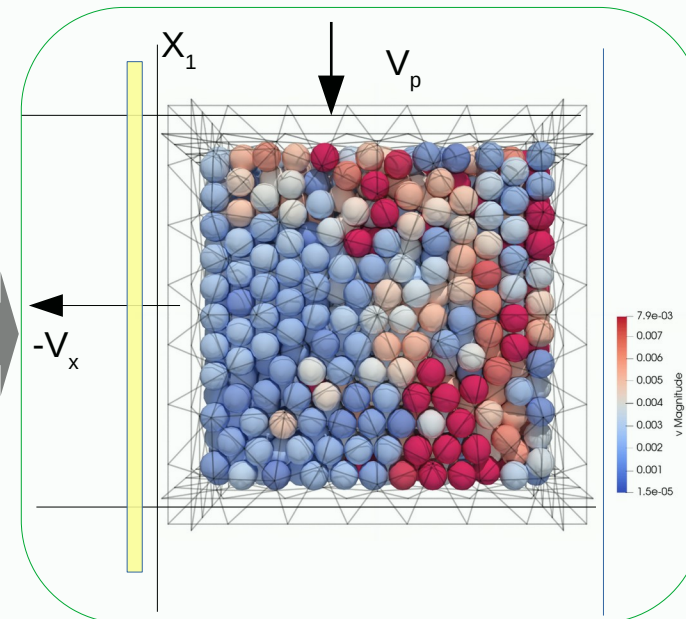
### (ii) Dilation



Compaction - dilation mechanics and  
Morphological evolution of granular  
sample

- (1) Extent of similarity
- (2) Extent of particle participation

## (c) Macroscale/continuum



Granular response  
**Macroscopic/continuum model  
parameters**