Toward the Quantitative Prediction of Instabilities in Solids Flows

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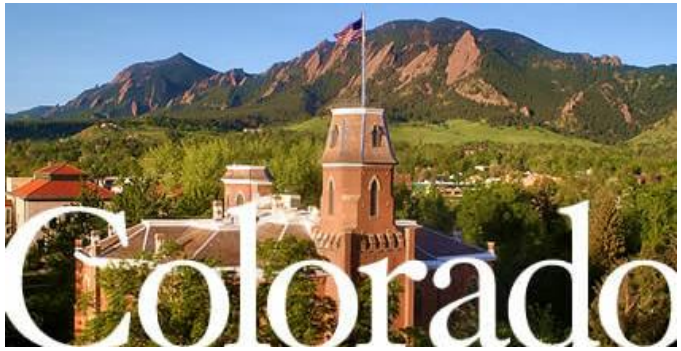
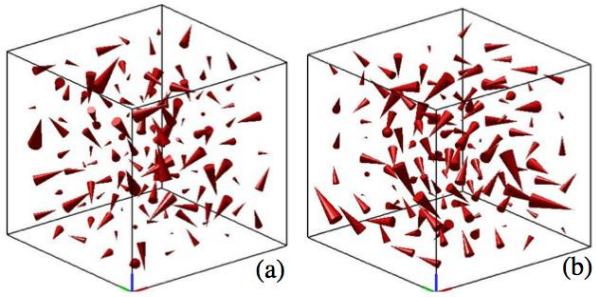


Motivation. Instabilities in granular flows are known to impact system performance, like gas-solid contacting in a circulating fluidized bed for the production of energy from coal and/or biomass. A fundamental prediction of these instabilities is lacking.



Current Work. Here we consider both velocity vortex (left) and particle clustering (below) instabilities. We use molecular dynamics (MD) as "ideal" experiments. We examine highly-dissipative systems and find that, contrary to previous theory, the vortex instability always precedes that of clustering. As our next step, we'll examine the role of the interstitial fluid phase on both instabilties.