Tata Institute of Fundamental Research
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Seminar

Perturbative Frictional Jamming and its relation to electron transport in disordered media

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It is well known that external perturbations evolve a frictional granular pack jammed in an initial metastable configuration to an eventual stable one. Beneficial in achieving efficient packing, athermal perturbations can also cause catastrophic failure. Understanding pack response to perturbations naturally carries both fundamental and applied significance. In a related context, the power law pressure increase against packing fraction is considered one signature of the frictionless jamming transition. In contrast, independent studies reveal frictional jamming exhibits an initial exponential pressure rise before deviating towards the putative power law. The range of packing fraction values over which pressure rises exponentially is marked by a marginally stable solid (fragile state) sensitive to perturbations. In this talk, I report experiments on frictional granular pack pressure response to controlled perturbations in this fragile state. In particular, I will deduce an empirical result from the experimental data which establishes a close correspondence between this classical (frictional jamming) problem and a well-known quantum effect for electron transport in amorphous semiconductors.

Monday, Dec 23rd 2019

11:30 AM (Tea/Coffee at 11:00 AM)

Seminar Hall, TIFR-H