Title:
Modeling the Effect of Flow on Freezing: From Kinetic Theory to Hydrodynamics

Abstract:
Solid-liquid phase transitions are well understood in the absence of flow through advances in classical density functional theory of freezing. The effect of flow on freezing is however yet to be thoroughly investigated. This talk will outline an approach to study the same. By systematic coarse graining of a kinetic description of dense gases, we will derive a meso-scale hydrodynamic theory for freezing. The theory captures atomistic length scales with diffusive timescales. Using numerical simulations of the hydrodynamic model, the role of flow on freezing transition will be illustrated.
This work was done in collaboration with Aparna Baskaran (Brandeis University) and John Lowengrub (University of California Irvine).

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