Rough-Smooth-Rough Interface transition in a supported lipid bilayer system PIYUSH VERMA, NICK MELOSH, Stanford University — Dynamic evolution of interfaces with quenched disorder is common in nature including fluid flow in porous media, granular particle flow and bacterial colony growth. These interfaces, which are either modeled using the Quenched-KPZ equation or the Quenched-Edward-Wilkinson (QEW) equation, expand due to a driving force while the edge profile roughens monotonically over time due to a distribution of disordered trapping defects. We studied interface expansion of a supported phospholipid bilayer, which is an ideal two dimensional viscoelastic material. Surprisingly, we observed a unique rough-smooth-rough bilayer interface transition on chromium oxide which has never been reported before. This transition was found to be a result of the viscoelasticity of the lipid bilayer and could be modeled using a modified QEW equation, which includes a spring-like term to account for the bilayer elasticity.

Piyush Verma
Stanford University

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