

1090-35-437

**Baskar Ganapathysubramanian\***, Iowa State University, Ames, IA 50010. *Modeling evaporation & phase-separation in thin film evaporation: Cahn-Hilliard-Cook equations, adaptive time-stepping and Linear stability analysis.*

We develop a predictive computational framework to model morphology evolution during solvent-based fabrication of thin films. We focus on two distinct physical phenomena: evaporation and phase separation. We formulate this multi-physics problem using a phase field approach using a set of three phase field variables to represent the volume fraction of solvent, and the two solutes that determine the final morphology. We detail the challenges faced in numerically solving this set of stochastic equations. A primary challenge is related to the multiple temporal and spatial scales inherent in this transient non-linear problem. By focusing on the two sources of multiple temporal and spatial scales – one determined by phase separation, and the other driven by the dynamics of evaporation – we leverage adaptive space-time strategies. We address several numerical challenges and show how a computationally efficient approach augments experiments and provides predictions at levels close to device scale. (Received March 06, 2013)