1046-35-101 **Thomas Dean Stephens*** (tstephe3@gmu.edu), 8129 Boss Street, Vienna, VA 22182.
Understanding and predicting materials properties from phase-field simulations. Preliminary report.

In this talk the interaction of diffusive processes will be explored from the perspective of reaction-diffusion systems arising in materials applications, such as Allen-Cahn and Cahn- Hilliard type models derived from thermodynamic principles. Qualitative behavior of these models and their dynamics will be investigated and numerical simulations will be used to explore the stability of their solutions. Several extensions of these models and their the system morphology and mesoscale behavior will be discussed. (Received July 22, 2008)