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R H Hoppe, Rahul Kumar and **Natasha S Sharma*** (nssharma@utep.edu), Department of Mathematical Sciences, University of Texas at El Paso, El Paso, 79968, and **James Winkle**. *A Phase Field Model for Polycrystallization Processes in Binary Mixtures.*

In this talk, we consider the phase field model for polycrystallization in the solidification of binary mixtures in the domain $\Omega \subset \mathbb{R}^2$. This model is based on a free energy functional in terms of three order parameters: the local crystallinity ϕ , the concentration c of one of the components of the binary mixture, and the local orientation Θ of the crystals. The equations of motion are given by an initial-boundary value problem for a coupled system of partial differential equations consisting of two quasilinear second order parabolic equations (in ϕ and Θ) and one quasilinear fourth order parabolic equation of Cahn-Hilliard type equation in c . We prove the existence of a weak solution by performing an implicit discretization in time and splitting of the equations. Using regularity results for quasilinear parabolic equations, it is shown that a solution of the time-discrete system converges to a weak solution of the original system. (Received September 26, 2017)