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Malgorzata Peszynska* (mpesz@math.oregonstate.edu), Mathematics, Oregon State University, Corvallis, OR 97331. *Phase field model for mixtures: convexity and regularity*. Preliminary report.

In this talk we discuss a phase-field model for two-component mixture of methane and water which under low temperature and high pressure conditions can exist either in liquid or crystal (hydrate) phase. The model, originally proposed by [Tegze et al, 2010] is a gradient flow of an energy functional, with degenerate mobilities. We discuss appropriate convexity conditions, and the degenerate and singular advection-diffusion-reaction equation which governs the migration of methane across the phase interface. If time allows, we present numerical simulations. (Received January 13, 2018)