1126-65-195 **Amanda Diegel**, Louisianna State University, and **Shawn W. Walker*** (walker@math.lsu.edu), Dept. Of Mathematics, Lockett Hall, Baton Rouge, LA 70803-4918. *A Finite Element Scheme for a Phase Field Model of Nematic Liquid Crystals.*

We present a phase field model for nematic liquid crystals. Our model couples the Cahn-Hilliard equation to Ericksen's one constant model for nematic liquid crystals with variable degree of orientation. We present a special discretization of the liquid crystal energy that can handle the degenerate elliptic part without regularization. In order to develop time-stepping method, we derive a discrete gradient flow by computing variational derivatives and setting the discrete time derivatives equal to minus the gradient. A convex splitting finite element scheme is used for the Cahn-Hilliard equation. We prove that our discrete energy Gamma-converges to the continuous energy and our gradient flow scheme is energy minimizing. We also present numerical simulations to illustrate the method. (Received January 13, 2017)