1116-35-101 **Ugur G. Abdulla**, **Luke Thomas Andrejek**, **Christie M. Campbell*** (camp744@msu.edu), **Jian Du**, **Jonathon Goldfarb** and **Adam L. Prinkey**. *Evolution of Free Boundaries for the Nonlinear Fokker-Planck Equation.*

We investigate the problem on short-time behavior of interfaces and local solutions near it in the following Cauchy problem for the nonlinear diffusion equation with convection, the so called nonlinear Fokker-Planck equation: $u_t = (u^m)_{xx} + b(u^\gamma)_x, x \in \mathbb{R}, t > 0; u|_{t=0} = C(-x)_+^\alpha(1)$ where $m > 1, \gamma > 0$. The equation (1) arises in many applications, such as water infiltration in a porous medium, transport of energy in plasma, etc. Full classification of the short-time behavior of interfaces and local solutions for the reaction-diffusion equation are given in [Abdulla and King, SIAM J. Math. Anal., 32, 2(2000), 235-260] and [Abdulla, Nonlinear Analysis, 50, 4(2002), 541-560]. The goal of this research is to apply the methods of these papers, i.e. rescaling, construction of super- and subsolutions, and special comparison theorems in irregular domain to solve the open problem for the diffusion-convection equation (1). The behavior of the interface for $b > 0$ depends on the competition between diffusion and convection. We identify regions of the (α, γ)-parameter space where one dominates over the other and prove explicit formulae for the interface and local solution, with precise estimates. A WENO scheme is applied and supports our estimates. (Received July 23, 2015)