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Yekaterina Epshteyn* (yee1@math.pitt.edu), 301 Thackeray Hall, University of Pittsburgh, Pittsburgh, PA 15260, and **Beatrice Riviere**. *High Order Fully Coupled Discontinuous Finite Element Methods For Two-Phase Flow*.

In this presentation we will consider two different formulations to model two-phase flow problems arising in porous media: "phase-pressure, phase-saturation" and "global-pressure, phase-saturation" formulation. We will develop implicit, fully coupled schemes based on Discontinuous Galerkin methods to solve numerically two-phase flow problems. Numerical analysis(existence of the discrete solution, convergence) of the introduced schemes and examples of simulations of homogeneous and heterogeneous media on structured and unstructured meshes will be presented. (Received September 21, 2006)