1105-65-20 **Xiaoming He*** (hex@mst.edu), Department of Mathematcis and Statistics, 400 W 12th St, Missouri University of Science and Technology, Rolla, MO 65401, and **Jian Li**, **Yanping Lin** and **Ju Ming**. *A multi-physics domain decomposition method for Navier-Stokes-Darcy model.*

The Navier-Stokes-Darcy model arises in many interesting real world applications, including groundwater flows in karst aquifers, interaction between surface and subsurface flows, industrial filtrations, fractured reservoir, and so on. This model describes the free flow of a liquid by the Navier-Stokes equation and the confined flow in a porous media by the Darcy equation; the two flows are coupled through interface conditions.

This presentation discusses a multi-physics domain decomposition method for solving the coupled steady state Navier-Stokes-Darcy system with the Beavers-Joseph interface condition. The wellposedness of this system is first showed by using a branch of singular solutions and the existing theoretical results on the Beavers-Joseph interface condition. Then Robin boundary conditions on the interface are constructed based on the physical interface conditions to decouple the Navier-Stokes and Darcy parts of the system. A parallel iterative domain decomposition method is developed according to these Robin boundary conditions and then analyzed for the convergence. Numerical examples are presented to illustrate the features of this method and verify the theoretical results. (Received July 02, 2014)