1171-65-49   **Jiangguo Liu*** (`liu@math.colostate.edu`), **Graham Harper**, **Tim Wildey** and **Simon Tavener**. *New finite element solvers for coupled Stokes-Darcy flow problems.*

In this talk, we present new finite element solvers for coupled Stokes–Darcy flow problems based on combination of the novel weak Galerkin methods for the Darcy equation and some classical finite elements for the Stokes flow. We shall focus on quadrilateral meshes, on which the classical Bernardi–Raugel element pair (BR_1, Q_1) is used for the Stokes equations. For Darcy flow discretization, piecewise constant approximants separately defined in element interiors and on edges are utilized to approximate the Darcy pressure. The discrete weak gradients of these shape functions and the numerical Darcy velocity are established in the lowest order Arbogast–Correa space. Numerical results along with main ideas for error analysis will be presented to demonstrate the accuracy and efficiency of these new solvers. (Received August 06, 2021)