1163-65-1677   **Adrianna Gillman***, 526 UCB, Boulder, CO 803090526. *A high order accurate solution techniques for Stokes equations.* Preliminary report.

This talk presents a high order discretization technique for variable coefficient steady Stokes' equation which comes with an efficient direct solver. The discretization is based on local spectral collocation. The local approximations are "glued" together by enforcing the continuity of the traction and the velocity along shared interfaces. The computational cost of constructing the associated nested dissection inspired direct solver is $O(N^{1.5})$ where N is the number discretization points. The cost for applying the inverse scales $O(Nlog(N))$ with a small constant prefactor. The combination of high order approximations and efficient solves make this technique ideal to be combined with time-stepping methods for unsteady Stokes' equation. Numerical results will illustrate the performance of the unsteady Stokes' solver. (Received September 16, 2020)