1141-65-75 **Mingchang Ding*** (dmcvamos@udel.edu), **Xiaofeng Cai** and **Jingmei Qiu**. *Efficient and highly accurate semi-Lagrangian discontinuous Galerkin method for convection-diffusion problems.*

We propose to organically combine semi-Lagrangian discontinuous Galerkin (SLDG) method to convection terms with local DG (LDG) scheme to diffusion terms for convection-diffusion problems. In particular, we apply a weak formulation of the SLDG method for the convection term (Cai, Guo and Qiu, JSC, 2017), and use high order implicit Runge-Kutta method for a LDG discretization of the diffusion term along characteristics . The proposed scheme is shown to be mass conservative, high order accurate in both space and in time, and highly efficient due to large time stepping sizes allowed from the semi-Lagrangian and implicit nature of time discretization. The scheme can be straightforwardly extended to 2D problems without operator splitting in the truly multi-D SLDG framework previously proposed. The performance of the scheme will be showcased by several classical linear test problems such as rigid body rotation, as well as incompressible Navier-Stokes equations. (Received July 16, 2018)