1068-35-59 **Nathan Kirk Pennington*** (npenning@ksu.edu), 138 Cardwell Hall, Manhattan, KS 66506-2602. *Local and global existence of solutions to the Lagrangian Averaged Navier-Stokes equations with weak initial data.*

The Lagrangian Averaged Navier-Stokes equations are a recently derived approximation to the Navier-Stokes equations. As the name suggests, the Lagrangian Averaged Navier-Stokes are derived by averaging at the Lagrangian level, and the resulting PDE has better controlled long time behavior than the Navier-Stokes equations. In this talk, we seek low regularity, local solutions to the Lagrangian Averaged Navier-Stokes equations with initial data in Sobolev and Besov spaces. The principal obstacle to overcome here is the presence of a nonlinear term in the Lagrangian Averaged Navier-Stokes equations that is not present in the Navier-Stokes equations. In the special case of L^2 Sobolev and Besov spaces, we exploit the improved long time behavior of the Lagrangian Averaged Navier-Stokes equations to extend our local solutions to global solutions. (Received January 10, 2011)