1063-76-259   **David T Uminsky*** (`duminsky@math.ucla.edu`), 520 Portola Plaza, Box 951555, Los Angeles, CA 90095-1555, and **Gene Wayne** (`cew@math.bu.edu`), **Alethea Barbaro** (`alethea@math.ucla.edu`) and **Vitalii Ostrovskyi** (`ostrovsk@usc.edu`). *A multi-moment vortex method for 2D viscous fluids.*

In this talk we introduce a new vortex method for 2D incompressible viscous fluids which incorporates Hermite moment corrections to radially symmetric Gaussian basis functions. Convergence of the Hermite expansion is proven and the higher order Hermite moments allow for each particle to deform under convection. We analyze the case of a single particle with many Hermite moments in the context of a shear diffusion example and discuss the improved spatial accuracy of the method. Time permitting, we will provide some examples of a large number of particles with fewer Hermite moments and discuss the trade off between computational efficiency and spatial accuracy. (Received August 17, 2010)