1135-35-498 **Vincent R Martinez*** (vmartin6@tulane.edu), New Orleans, LA 70118, and **Michael Jolly**, **Tural Sadigov** and **Edriss Titi**. *Existence of a determining form for the subcritical surface quasi-geostrophic equation.*

The existence of an inertial manifold for the 2D incompressible Navier-Stokes equations (NSE) remains an outstanding open problem. When restricted to this manifold, the dynamics of the original system reduces to that of a finite-dimensional ordinary differential equation (ODE), known as an "inertial form," in a finite-dimensional phase space. In a series of works by C. Foias, M. Jolly, R. Kravchenko, and E. Titi, it was nevertheless shown that one can embed the global attractor of the 2D NSE into that of an ODE, known as a "determining form," but over an infinite-dimensional phase space. That determining forms exist for some other weakly dissipative systems, e.g., 1D damped-driven Korteweg de Vries or nonlinear Schrodinger equations, for which the existence of an inertial manifold is still unresolved, has also been proved recently by M. Jolly, T. Sadigov, and E. Titi. In this lecture, we show that this is the case for the subcritically dissipative surface quasi-geostrophic equation as well. To do so, we establish appropriate a priori bounds and a "Foias-Prodi" type phenomenon, in which high modes of the solution are asymptotically enslaved to its low modes. This is accomplished via De Giorgi techniques and elementary harmonic analysis. (Received September 27, 2017)