1077-35-941 **Zhiwu Lin** and **Chongchun Zeng*** (zengch@math.gatech.edu). *Unstable manifolds and L^2 nonlinear instability of Euler equations.*

We consider a steady state v_0 of the Euler equation in a fixed bounded domain in R^n. Suppose the linearized equation has an exponential dichotomy with a finite dimensional unstable subspace. By rewriting the Euler equation as an ODE on an infinite dimensional manifold in H^k, $k > \frac{n}{2} + 1$, the unstable manifold of v_0 is constructed under certain conditions on the Lyapunov exponents of the vector field v_0. This in turn shows the nonlinear instability of v_0 in the sense that small H^k perturbations can lead to L^2 derivation of the solutions. (Received September 14, 2011)