1092-35-278 **Ian Tice*** (iantice@andrew.cmu.edu). *Instability theory of gaseous stars.*

A simple astrophysical model of stars considers them to be a compact mass of self-gravitating compressible fluid. Such a fluid obeys the compressible Navier-Stokes-Poisson equations. In the case of "polytropic gases," in which the pressure behaves like $P = K\rho^\gamma$ for $K > 0$ an entropy constant and $\gamma > 1$ an adiabatic constant, one may construct compactly supported, finite mass, radially symmetric equilibrium solutions by reducing to the Lane-Emden ODE (at least when $6/5 < \gamma < 2$). A fundamental question in astrophysics is the stability of such equilibria, and it was believed that they should be unstable for $6/5 < \gamma < 4/3$ and stable for $4/3 \leq \gamma < 2$. In this talk we will prove that the Navier-Stokes-Poisson system, perturbed around a Lane-Emden equilibrium configuration, is nonlinearly unstable when $6/5 < \gamma < 4/3$. This is joint work with Juhi Jang. (Received August 12, 2013)