1075-35-52 **Chongsheng Cao** and **Jiahong Wu*** (jiahong@math.okstate.edu), Department of Mathematics, 401 Mathematical Sciences, Oklahoma State University, Stillwater, OK 74078.

Global regularity for the 2D anisotropic Boussinesq equations with vertical dissipation.

This talk presents a very recent result asserting the global (in time) regularity of classical solutions to the 2D anisotropic Boussinesq equations with only vertical dissipation. The Boussinseq equations concerned here model many geophysical flows such as atmospheric fronts and ocean circulations. Mathematically the 2D Boussinesq equations serve as a lower-dimensional model of the 3D hydrodynamics equations. In fact, the 2D Boussinesq equations retain some key features of the 3D Euler and Navier-Stokes equations such as the vortex stretching mechanism. In the last few years the global regularity problem on the 2D Boussinesq equations with partial dissipation has attracted considerable attention. The global regularity problem for the 2D anisotropic Boussinesq equations with only vertical dissipation is very challenging due to the lack of control on the horizontal derivatives. To solve this problem, we bound the derivatives in terms of the L^∞-norm of the vertical velocity v and prove that $\|v\|_{L^r}$ with $2 \le r < \infty$ at any time does not grow faster than $\sqrt{r \log r}$ as r increases. A delicate interpolation inequality connecting $\|v\|_{L^\infty}$ and $\|v\|_{L^r}$ then yields the desired global regularity. (Received August 17, 2011)