1049-35-173 **Ning Ju*** (`ningju@math.okstate.edu`), Department of Mathematics, Oklahoma State University, 401 Mathematical Sciences, Stillwater, OK 74078. *Global Wellposedness for the 2D Boussinesq Equations with Fractional Dissipation.*

Consider the following initial value problem of the two dimensional Boussinesq equation with fractional dissipation:

$$\begin{cases} \partial_t v + (v\cdot\nabla)v &= -\nabla p + \theta e_2 - \nu\Lambda^{2\beta}v, \quad \Lambda = (-\Delta)^{\frac{1}{2}}, \\ \nabla\cdot v &= 0, \\ \theta_t + v\cdot\nabla\theta &= -\kappa\Lambda^{2\alpha}\theta, \\ v(\cdot,0) &= v_0, \\ \theta(\cdot,0) &= \theta_0. \end{cases}$$

where $v(x,t)$ is the velocity vector field of the incompressible fluid, $\theta(x,t)$ is the fluid temperature, p is the fluid pressure and e_2 is the vector $(0,1)$ in the physical domain. The parameters $\alpha,\beta\in[0,1)$, $\nu,\kappa>0$ are constants.

We prove existence and uniqueness of the global (in time) strong solution to the above Cauchy problem in Sobolev space for $\alpha\geqslant\frac{1}{2}$ and $\beta\geqslant\frac{1}{2}$. Other related issues will also be discussed. (Received March 03, 2009)