

1022-35-132

Ning Ju* (ningju@math.okstate.edu), Department of Mathematics, Oklahoma State University, 401 Mathematical Sciences, Stillwater, OK 74078. *The dissipative 2D quasi-geostrophic equation.*

Local well posedness of 2D dissipative Quasi-Geostrophic equation in the critical Sobolev Space $H^{2-2\alpha}(\Omega)$ ($\Omega = \mathbb{R}^2$ or \mathbb{T}^2) will be presented. As the first corollary, it can be shown that for the sub-critical dissipative case ($\alpha > \frac{1}{2}$), the global solution exists in $H^{2-2\alpha}$ when it is initially in $H^{2-2\alpha}$ and the solution decays to 0 for the unforced case; the global attractor exists in $H^{2-2\alpha}$ when $\Omega = \mathbb{T}^2$ and when the external force is non-zero and independent of time. As the second corollary, it can be shown that for the critical dissipative case ($\alpha = \frac{1}{2}$), the global solution exists in any H^s ($s \geq 2 - 2\alpha$) if it is initially in H^s . Moreover, the solution decays to 0 in these spaces as t goes to infinity for the unforced case; the solution is bounded uniformly for the autonomously forced case. Further related results especially on the long-time dynamics of the solutions may also be discussed. (Received September 11, 2006)