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Eleftherios Gkioulekas* (1f@mail.ucf.edu), University of Central Florida, Department of Mathematics, P.O. Box 161364, Orlando, FL 32816-1364. *Current status of two dimensional turbulence*. Preliminary report.

The most intriguing aspect of two-dimensional turbulence is that it exhibits a far richer range of behaviors than three-dimensional turbulence. The characteristic feature of three-dimensional turbulence is an energy cascade from large scales to small scales. This cascade is very robust and it exhibits universal self-similar behavior. In two-dimensional turbulence, on the other hand, one expects a direct enstrophy cascade and an inverse energy cascade. Experiments show that neither cascade is robust, although both cascades can be observed under certain circumstances. There is considerable theoretical work, both on the energy cascade and the enstrophy cascade, that can account for characteristic features of both cascades. However, all such work involves implicitly the assumption that the cascades will form successfully. There is no theory that can account for the conditions needed for the robustness of the cascades, although there are some “no go” results. My presentation will review the current state of the field, as well as my own work, presently in progress, in this direction. (Received August 19, 2007)