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Jiahong Wu* (jiahong.wu@okstate.edu), Department of Mathematics, 401 Mathematical Sciences, Stillwater, OK 74078. *Fluid dynamics equations with fractional partial dissipation.*

There have been considerable recent developments on fluid dynamics equations with partial or fractional dissipation. These partial differential equations (PDEs) are not only mathematically important but also physically relevant. This talk focuses on fundamental mathematical problems on several such PDEs with fractional partial dissipation including the 3D Navier-Stokes, the 2D Boussinesq and the 2D MHD equations with fractional partial dissipation. When there is only fractional partial dissipation, classical tools such as the maximal regularity estimates for the heat operator no longer apply. New techniques have been developed to fully exploit the regularization effects of such incomplete dissipation. We present several global regularity results based on these techniques. (Received January 18, 2017)