1117-35-84 **Mimi Dai*** (mdai@uic.edu) and **Alexey Cheskidov**. *Regularity for the 3D Navier-Stokes equations and related problems.*

As one of the most significant problems in the study of partial differential equations arising in fluid dynamics, Leray's conjecture in 1930's regarding the appearance of singularities for the 3-dimensional (3D) Navier-Stokes equations (NSE) has been neither proved nor disproved. The problems of blow-up have been extensively studied for decades using different techniques. By using a method of wavenumber splitting which originated from Kolmogorov's theory of turbulence, we obtained a new regularity criterion for the 3D NSE. The new criterion improves the classical Prodi-Serrin, Beale-Kato-Majda criteria and their extensions. Related problems, such as the well/ill-posedness, will be discussed as well. (Received January 04, 2016)