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## **DNS of Turbulence under Simple Geometrical Conditions**

### **-- Universality in Small Scale Statistics --**

In 1941, Kolmogorov proposed an idea of universal equilibrium range at small scales in high Reynolds number turbulence. According to the idea, the statistics in the equilibrium range is universal in the sense that it is insensitive to the detail of the large scale flow conditions, and the understanding of the statistics may provide a sound basis for constructing turbulence models. The idea also justifies the use of simple geometrical conditions in direct numerical simulations (DNSs) of turbulence for the study of the small scale statistics.

The talk begins with an overview of recent studies on the small scale statistics of turbulence on the basis of high resolution DNS of incompressible turbulence in a periodic box with the Taylor micro-scale Reynolds number up to approximately 1130 and the number of grid points  $4096^3$ . The talk then presents a discussion on the universal equilibrium range in turbulent shear flow, stratified turbulence and MHD turbulence under a strong uniform magnetic field at low magnetic Reynolds number, in the light of DNS under simple geometrical conditions. A prospect of the study of the universality in the small scale statistics in turbulent flows including wall bounded turbulence by petascale computing is also presented.