

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**DNS and LES of homogeneous MHD turbulence under Hall and FLR effects**<sup>1</sup> HIDEAKI MIURA, National Institute for Fusion Science, FUJIHIRO HAMBADA, Institute of Industrial Science, The University of Tokyo — Direct numerical simulation (DNS) and Large Eddy Simulation (LES) of homogeneous MHD turbulence under Hall and FLR effects are carried out for some combinations of the ion skin depth and the Larmor radius to the resistive scales in order to study influences of the the scales shorter than the ion skin depth and the Larmor radius to the scales longer than them. Example to show necessity of the LES approach in numerical simulations of plasma instability and turbulence are presented[1,2]. Numerical results by DNS are made use for developing a Sub-Grid-Scale (SGS) model which represents the effects of the scales shorter than the grid width to the scales grid scales and apply the SGS model to LES. We emphasize that the SGS model is developed taking effects of the Hall and FLR effects into account. Applicability of the SGS model to LES of homogeneous turbulence is examined by a comparison between DNS and LES.

[1] H. Miura, F.Hambada, and A.Ito, "Two-fluid sub-grid-scale viscosity in nonlinear simulation of ballooning modes in a heliotron device", Nuclear Fusion 57 076034 (2016).

[2] W.Horton, H.Miura, L.Zheng, "Two-fluid simulations of edge-plasma interchange/tearing instability", US-EU TTF workshop (March 17-19, 2019, Austin, U.S.A.)

<sup>1</sup>KAKENHI Grant No.15H02218, 17K05734

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Date submitted: 26 Jun 2019

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