Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Predictability of wall-modeled large-eddy simulation for shock wave/turbulent boundary layer interacting separated flows[1] YUMA FUKUSHIMA, SOSHI KAWAI, Tohoku University — In this talk, we first discuss the important flow features (such as separation and reattachment) of the shock wave and turbulent boundary layers interaction based on wall-resolved large-eddy simulation (WRLES) database. By using the WRLES database, we then investigate the capability of the wall-stress-model-based equilibrium and non-equilibrium wall-modeling in LES [Kawai and Larsson, PoF 2012, 2013] for predicting the boundary layer separation and reattachment induced by a strong pressure gradient of the shock wave. In this study, we focus on non-equilibrium terms in the streamwise momentum equation (pressure gradient and convection terms) that are important in the flow separation and reattachment and investigate how these terms are treated in the wall-modeled LES (WMLES). We also discuss the WMLES of transonic airfoil buffet phenomena at high Reynolds number, where the unsteady shock wave induces the separation and reattachment.

[1]This work was supported in part by MEXT as a social and scientific priority issue to be tackled by using post-K computer. A part of this research used computational resources of the K computer provided by the RIKEN Advanced Institute for Computational Science (Project ID:hp150254,hp160205,hp170267,hp180185,hp180158,hp190164).

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Date submitted: 01 Aug 2019 Electronic form version 1.4