Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

LES of a turbulent channel flow with a predictive wall model[1] MICHIO INOUE, DALE PULLIN, California Institute of Technology, IVAN MARUSIC, ROMAIN MATHIS, University of Melbourne — Large-eddy simulations (LES) of turbulent channel flow are presented. These LES combine the stretched-vortex, subgrid-scale (SGS) model with a near-wall model (Chung & Pullin *JFM* 2009) that here provides a plane-averaged, wall-shear stress together with a plane-averaged slip velocity at a raised or "virtual" wall. Instantaneous stream-wise fluctuations are then added to this slip velocity using an empirical inner-outer wall model (Mathis *et al*, *JFM* 2011) driven by a velocity time-series obtained from within the log-layer of the outer flow. This spatially fluctuating slip velocity is used as a boundary condition for the outer LES. Results using several variations of this wall model are described for turbulent channel flow at Reynolds numbers Re_τ up to 2.2×10^4.

[1]NSF CBET-1235605

Dale Pullin
California Institute of Technology

Date submitted: 31 Jul 2012 Electronic form version 1.4