

Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Entropic

Lattice Boltzmann: an implicit Large-Eddy Simulation?¹ GUILLAUME TAUZIN, LUCA BIFERALE, MAURO SBRAGAGLIA, Univ of Rome Tor Vergata, ABHINEET GUPTA, FEDERICO TOSCHI, Technical University Eindhoven, MATTHIAS EHRHARDT, ANDREAS BARTEL, Bergische Universitaet Wuppertal — We study the modeling of turbulence implied by the unconditionally stable Entropic Lattice Boltzmann Method (ELBM). We first focus on 2D homogeneous turbulence, for which we conduct numerical simulations for a wide range of relaxation times τ . For these simulations, we analyze the effective viscosity obtained by numerically differentiating the kinetic energy and enstrophy balance equations averaged over sub-domains of the computational grid. We aim at understanding the behavior of the implied sub-grid scale model and verify a formulation previously derived using Chapman-Enskog expansion. These ELBM benchmark simulations are thus useful to understand the range of validity of ELBM as a turbulence model. Finally, we will discuss an extension of the previously obtained results to the 3D case.

¹Supported by the European Unions Framework Programme for Research and Innovation Horizon 2020 (2014-2020) under the Marie Skłodowska-Curie Grant Agreement No.642069 and by the European Research Council under the ERC Grant Agreement No.339032.

Guillaume Tauzin
Univ of Rome Tor Vergata

Date submitted: 26 Jul 2017

Electronic form version 1.4