

Abstract Submitted
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Scalar Magnetic Field Distribution Function Approach to MHD Turbulence TAO WANG, GEORGE VAHALA, William & Mary, LINDA VAHALA, Old Dominion University — Lattice Boltzmann (LB) representations are mesoscopic algorithms that exploit a simple collide-stream scheme that is ideal for parallelization – even for non-periodic boundary conditions. Moreover, in LB one can enforce to machine accuracy. Typically one has introduced a vector distribution function for the magnetic field to account for the asymmetry tensor in the magnetic field evolution as opposed to the symmetric stress tensor in velocity evolution. Here we investigate 2D MHD turbulence by working with a scalar magnetic distribution function representation. A major advantage of the scalar representation is the much reduced computational memory requirements, simpler boundary condition enforcement, and simple entropic stabilization schemes. The Orszag-Tang vortex will be examined as well as some LES closure schemes using Elsasser variables.

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