Scales and the critical Reynolds numbers of the minimum state magnetohydrodynamic turbulence YE ZHOU, Lawrence Livermore National Laboratory, Livermore, California 94550, SEAN OUGHTON, Department of Mathematics, University of Waikato, Hamilton 3240, New Zealand — Magnetohydrodynamic (MHD) systems can be strongly nonlinear (turbulent) when their kinetic and magnetic Reynolds numbers are high, as is the case in many astrophysical and space plasma flows. Unfortunately these high Reynolds numbers are typically much greater than those currently attainable in numerical simulations of MHD turbulence. A natural question to ask is how can researchers be sure that their simulations have reproduced all of the most influential physics of the flows and magnetic fields? In this paper, a metric is defined to indicate whether the necessary physics of interest has been captured. It is found that current computing resources will typically not be sufficient to achieve this minimum state metric.

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