Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Atomic Weight Effects in Turbulence Onset as a Continuous Phase Transition[1] JOSEPH JOHNSON III, EPHREM MEZONLIN, Florida A&M University, JEAN OROU CHABI, IMSP, National University of Benin, Porto Novo, Benin — When there is a mass dependence in the Gibbs free energy for a system experiencing a continuous phase transition, such mass dependence can influence the behavior in critical parameters. Even when the cause cannot be easily identified, atomic weight sensitivity has often been found to be a reliable feature of such systems such as, e.g., the $Tc = 1/\sqrt{M}$ behavior in Type II superconductors. Since lamda-like behavior is observed in the evolution of several turbulence parameters, we have determined the circumstances under which various atomic weight influences might be expected in near-critical-like regimes for turbulence onset. Specifically, we explore the dynamics through which local atomic-level interactions produce turbulence constrained by local atomic weights. Comparisons are made between the theoretical predictions and experimental data from turbulent plasmas and gases.

[1]Work supported in part by grants to Florida A&M University from DOE Fusion Energy Sciences and from NASA MURED

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Date submitted: 01 Sep 2005 Electronic form version 1.4