Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

A Class of 3D Gyroviscous MHD Models[1] MANASVI LINGAM, Florida Tech, PHILIP MORRISON, UT Austin, ALEXANDER WURM, Western New England University — It is well-known that Finite Larmor Radius (FLR) effects play a major role in governing the behavior of plasmas. Despite the undoubted importance of FLR contributions, 3D models that incorporated these effects - with one of the most notable being the (non-dissipative) gyroviscosity - in a self-consistent manner have been relatively few in number. Hence, a Hamiltonian and Action Principle (HAP) formalism for deriving 3D gyroviscous magnetohydrodynamic models is presented [1]. The uniqueness of the approach stems from constructing the gyroviscous tensor from first principles and its ability to explain the origin of the so-called gyromap and the gyroviscous terms. The procedure allows for the specification of free functions, which can be used to generate a wide range of gyroviscous models. Some of the implications of these models, especially in the context of the breakdown of angular momentum conservation, are discussed. [1] M. Lingam, P. J. Morrison A. Wurm, A class of three-dimensional gyroviscous magnetohydrodynamic models, J. Plasma Phys., arXiv:2002.11272 (2020)

[1]Partly funded by DE-FG05-80ET-53088

Manasvi Lingam
Florida Inst of Tech

Date submitted: 09 Jul 2020 Electronic form version 1.4