Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Extended MHD model for the study of shear flow dynamics in magnetized plasmas S.S. CERRI, Max-Planck-Institute for Plasma Physics, Garching, Germany, P. HENRI, Lab. Lagrange, CNRS, Observ. de la Côte d'Azur, Nice, France, F. CALIFANO, Phys. Dept. University of Pisa Italy, D. DEL SARTO, Institut Jean Lamour, Université de Lorraine, France, M. FAGANELLO, Aix-Marseille University, France, F. PEGORARO, Phys. Dept. University of Pisa Italy — We present an "extended MHD" model set of equations aimed at studying magnetized plasma regimes where fluctuations arise at scale lengths comparable to the ion Larmor radius (or to the ion skin depth), while the characteristic frequencies remain smaller than the ion cyclotron frequency. This system of equations conserves the total energy explicitly. Our main goal is the investigation of the multi-scale dynamics resulting from the development of the Kelvin-Helmholtz instability driven by of a shear flow as, e.g., is the case of the interaction of the solar wind with the Earth's magnetosphere. Using this model, we have obtained a new set of equilibria that include FLR microscopic effects accounting for the contribution of the pressure tensor that, in such conditions, reacts on the flow itself on a time scale comparable to the ideal time scale. These equilibria are an extension of the standard MHD equilibria and are very well suited for fully kinetic simulations where on the contrary standard mechanical force equilibria generate strong spurious fluctuations and do not relax towards Vlasov equilibria.

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Date submitted: 10 Jul 2013 Electronic form version 1.4