

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

A linear theory of waves in partially ionized space plasmas¹

MARTY KELLUM, Division of Mathematics, Calhoun Community College P. O. Box 2216 Decatur, AL 35609-2216, DASTGEER SHAIKH, Department of Physics, and Center for Space Plasma and Aeronomic Research (CSPAR) The University of Alabama in Huntsville 301 Sparkman Drive, Huntsvi — Partially ionized plasmas consist mainly of electrons, ions and significant neutral atoms. The nonlinear interactions amongst these species take place predominantly through direct collision or charge exchange processes. These interactions modify linear and non linear properties of the partially ionized plasma. In this work, we develop a one dimensional linear theory to investigate evolution of waves. In our model, the electrons and ions are described by a single fluid compressible magnetohydrodynamic (MHD) model and are coupled self-consistently to the neutral fluid via compressible hydrodynamic equations. Based on our self-consistent model, we investigate the propagation speed of Alfvénic modes in space and astrophysical plasma, interactions with the neutral fluid, growth rate, damping rate.

¹This work is performed under PH499 capstone course at UAHuntsville.

Dastgeer Shaikh
Dept of Physics, and Center for Space Plasma and
Aeronomic Research (CSPAR) The University of Alabama in Huntsville

Date submitted: 26 Jul 2010

Electronic form version 1.4