Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Interaction of Double and Triple Alfvenic Solitons in Non Maxwellian Space Plasmas KULDEEP SINGH, NARESHPAL SINGH SAINI, Guru Nanak Dev University, Amritsar, India — Over the past many years the variety of nonlinear structures, Alfven waves and the magnetoacoustic waves (slow and fast) are the basic wave modes in the magnetohydrodynamic (MHD) systems in which Alfvén waves are the low frequency waves which play a central role in many laboratory, cosmic as well as fusion plasmas where the plasma $\beta$is typically much smaller than the electron to ion mass ratio. The propagation and interaction of multi-solitons are important phenomena in plasma physics. They interact elastically and owing to this reason, the amplitudes of solitons do not change; however each soliton gets a phase shift. In the present work, we have investigated the propagation of ion acoustic kinetic Alfven waves in a low β plasma. In this regard, Korteweg de Vries equation is derived and discussed using the plasma parameters that are typically found in solar corona. The interaction of fast IAKAWs is explored by using the Hirota bilinear formalism, which admits multi-soliton solutions. It is observed that the values of the propagation vectors determine the interaction of solitary waves. It is pertinent to mention here that this solution describes two solitons travelling in the same direction and the soliton interaction takes place when the faster solitary wave overtakes the slower solitary wave. It is further noted that the amplitude of the respective solitary waves remain unchanged after the interaction, however, they do experience a phase shift. This study may also be helpful in understanding various non-linear coherent structures in space and astrophysical plasma environments.

Kuldeep Singh
Guru Nanak Dev University, Amritsar, India

Date submitted: 03 Jun 2019 Electronic form version 1.4