Contribution ID: **276** Type: **Oral Presentation**

The effects of ion beams on slow and fast ion-acoustic solitons in plasmas with two-temperature electrons

Monday, 4 July 2022 11:45 (15 minutes)

The Sagdeev pseudopotential formalism is used to investigate beam effects associated with drifting ions on the acoustic modes in a plasma which is composed of two warm (adiabatic) ion components and one or two-electron components (of different temperatures). One or both ion species are treated as drifting (beam) component(s). The primary objective of the study is to investigate the effect of the speed of the beam(s) on linear and nonlinear waves which are supported in the plasma system. Above a critical value for the beam speed, slow ion-acoustic solitons having unusual characteristics are supported which can propagate for speeds that are below the critical acoustic speed. For the case of symmetric beams (the oppositely directed beams have equal density and speed), both backward and forward propagating slow and fast ion-acoustic solitons occur for which propagation is symmetric with respect to negative and positive values of the Mach number (normalised soliton speed). For beams which are asymmetric (the counter-streaming beams have unequal density and speed), the symmetry breaks and the slow solitons can propagate only in the forward direction for Mach numbers which are between the lower and higher valued critical acoustic speeds. The fast ion-acoustic solitons are less sensitive to beam speed, although the Mach numbers shift to higher values for higher beam speeds.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary authors: Mr MAXENGANA, M. (South African National Space Agency (SANSA) Space Science); Dr MAHARAJ, S.K. (South African National Space Agency (SANSA) Space Science); Prof. BHARUTHRAM, R. (University of the Western Cape)

Presenter: Mr MAXENGANA, M. (South African National Space Agency (SANSA) Space Science)

Session Classification: Space Science

Track Classification: Track D2 - Space Science