

Nonlinear electrostatic fluctuations in the Earth's magnetosphere

Friday, September 29, 2023 8:30 AM (25 minutes)

Large-amplitude electrostatic solitary waves (ESWs) associated with asymmetric magnetic reconnection at the Earth's magnetopause are studied in a four-component plasma composed of a mixture of the magnetosheath and magnetosphere plasma of a cold, warm and hot electron populations, and background ions. The species are modeled as adiabatic fluids except for the hot electrons which have a kinetic vortex-like velocity distribution. Using the Sagdeev pseudopotential technique, for the plasma parameters recorded by the Magnetospheric Multiscale (MMS) mission in the magnetosheath side of the ion diffusion region, existence regime of the nonlinear electrostatic solitary wave structures is obtained. The results agree with the magnetosheath electrostatic waves having amplitudes of 100s mV/m and frequencies up to 3.2 kHz observed by the MMS.

Abstract Category

Fluid & Plasma Physics

Primary author: Dr RUFAL, Odotayo (NASA/CUA)

Presenter: Dr RUFAL, Odotayo (NASA/CUA)

Session Classification: Plasma Physics

Track Classification: Physics Research