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Magnetic field-aligned electrons escaping from plasma density minima in the cusp

A. Pedersen, B. Lybekk, S. Haaland, K. Svenes, I. Dandouras, and A. N. Fazakerley
University of Oslo, Dept. of Physics, Norway (arne.pedersen@fys.uio.no)

On Cluster the plasma density in very tenuous plasmas can be estimated based on spacecraft potential measurements. This has made it possible to detect plasma density minima of 0.01-0.1 cm^{-3} in the cusp poleward of the main precipitation of electrons and ions. Electron data from PEACE show that some of these minima have magnetic field-aligned outflow of electrons with energies of several hundred eV. Ion data from CIS will be used to look for possible related ion field-aligned flow. In this study the locations and the extents of plasma density minima, with electron outflow, will be determined for the northern and the southern cusp. Information about extent across the magnetic field can be obtained by using data from all four Cluster satellites, and electric field data can be used to detect plasma drift and wave activity. Possible connections to solar wind conditions and magnetosphere disturbance level will be presented