

Lower Hybrid Solitary Structures

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Lower hybrid solitary structures (LHSS) have been observed by sounding rockets in the auroral ionosphere for over a decade and a half. LHSS are spatial structures embedded in space plasmas containing ambient whistler mode hiss. They are characterized by a density depletion of a few percent to several tens of percent in which electric fields near, both above and below, the lower hybrid resonance are more intense than the background fields by a factor of three to five. LHSS have dimensions across the magnetic field of a few to many thermal ion gyroradii, usually 10-100 meters and a density profile that is Gaussian and consistent with cylindrical symmetry. Along the magnetic field the dimensions are estimated to be several kilometers to several hundred kilometers. Electric field interferometry reveals that the phase fronts of LHSS electric fields rotate azimuthally within the density depletions; right-hand above the lower hybrid resonance and left-hand below the lower hybrid resonance [Pinçon *et al.*, 1997; Schuck *et al.*, 1998; Bonnell *et al.*, 1998; Tjulin *et al.*, 2003; Schuck *et al.*, 2003]. The description of this phenomena was driven by the observations the Cornell University sounding rocket program headed by the late Paul Kintner.

References

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