Interaction between Flux Transfer Event Impulsive Structures and Plasmaspheric Drainage Plume: 3-D hybrid kinetic modeling and comparison with MMS observations

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Abstract

We present a new hybrid kinetic model to simulate the response of plasmaspheric drainage plumes to the impulsive flux transfer event. Since particle distributions attending the FTE event impulses and in the drainage plume are non-Maxwellian, wave-particle interactions play
a crucial role in energy transport within and outside the plumes. Finite gyroradius effects become important in mass loading of the FTE event impulse with the drainage plume ions. A double-peak structure develops from the initial basic rectangular pulse. First results show that FTE event impulse causes strong deformations in the global structure of the plume. The anisotropic ion velocity distribution functions
at the impulse front and inside the plume help us determine energy transport via wave-particle interactions.

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