3D Electromagnetic Particle Simulations about the Low Frequency Component of BEN

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According to PIC simulations, ESW (Electrostatic Solitary Waves) are generated from electron beam instabilities. ESW correspond the upper frequency component of BEN (Broadband Electrostatic Noise) which is frequently observed in space plasma. The generation mechanism of the low frequency component of BEN, however, is still unexplained. We went statistical analyses of the low-frequency component of the BEN observed by EFD onboard Geotail spacecraft, and investigated the relation between magnetic field strength, ion density and ion temperature. According to the spctrum analysee of the low frequency component of BEN, there are two different types of spectrum. We performed the 3-dimensional electromagnetic particle simulations about these two types of the low frequency component of BEN, and found low frequency waves are excited in both cases.We are going to further simulations with sufficient scale in time and space, and make clear the generation mechanism of the low frequency componet of BEN.

Keywords: Broadband Electrostatic Noise, 3-dimensional Electromagnetic Particle Simulations, Geotail Spacecraft

