

Evaluation of WPIA by PIC simulations for direct measurement of wave-particle interactions of whistler-mode chorus

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The "Wave Particle Interaction Analyzer (WPIA)" is a new instrumentation measuring interactions between plasma waves and electrons directly and quantitatively in space plasmas, which will be installed as a software function in the ERG satellite (Exploration of energization and Radiation in Geospace). In the WPIA, we use the wave vector and velocity vector of each electron respectively measured by wave and particle instruments on board spacecraft. One of the methods of the WPIA is to evaluate the energy exchange between waves and particles by calculating an inner product $\mathbf{E} \cdot \mathbf{v}$, where \mathbf{E} and \mathbf{v} are the wave electric field and the velocity vector of an electron, respectively. We evaluate the feasibility by applying the WPIA to the simulation results of whistler-mode chorus generation. We also discuss the implementation plan and the data processing flow of the WPIA to be realized in the ERG satellite.