PIC simulations on electric field antenna characteristics in plasma

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Antenna characteristics in plasmas such as input impedance, effective length and pickup factor are important in the plasma wave observation, particularly for calibration of wave data obtained from spacecraft. However, it is difficult to evaluate antenna characteristics in space plasma accurately because of complex interaction among antenna itself, plasma waves, background plasma and photoelectron sheath. In the present study, we focused on a dipole antenna and examined its characteristics in plasmas by performing three dimensional electromagnetic PIC(Particle-In-Cell) simulation. In the three dimensional PIC simulations we can treat a dipole antenna attached on spacecraft in plasmas by taking account of plasma kinetic effects. We particularly focus on photoelectron emission from antenna surface and investigated the influence on the antenna characteristics. In addition, we also examined the effect of spacecraft body on the antenna characteristics with or without photoelectron emission. Preliminary data will be shown and discussed on the photoelectron sheath environment and antenna characteristics.