Computer experiments on the neutralization process of spacecraft charging by using plasma contactor

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We studied the neutralization process of spacecraft charging with plasma contactor by performing PIC simulations. As adoped in the International Space Station, plasma contactor, which emits a dense plasma into the background plasma, controls the spacecraft charging. In the simulation model, we place a spacecraft wall immersed in the background plasma. A floating potential is determined by the balance of current flow at the wall. After the achievment of a floating potential, we start emitting plasma from the spacecraft in the simulations. We examined the transient process of the charging neutralization during the plasma emission. We also focus on the effect on the spacecraft environment such as the current loop created between the background plasma and the plasma cloud.