J250-P011 **Room: Poster Session Hall** **Time: May 23**

Basic analysis of spacecraft charging and its mitigation method by using three-dimensional electrostatic plasma simulations

Hideyuki Usui[1]; # kojiro Imasato[2]; Yoshiharu Omura[3]

[1] RISH, Kyoto Univ.; [2] RISH,Kyoto Univ.; [3] RISH, Kyoto Univ

We have analyzed spacecraft charging with a three-dimensional electrostatic plasma simulation. The spacecraft surface is basically composed of metal and dielectric materials. To treat the spacecraft charging in the simulations, we adopted the Capacity Matrix method which numerically handles the charge distribution on the spacecraft surface in self-consistent manner.

Between the metal part and dielectrics such as solar panels, differential charging can occur. In such a situation, the electrical discharge can happen between metals and dielectrics when the potential difference becomes large. In the worst case, the body of the satellite is damaged. As for our simulation, we confirmed the potential difference between metals and dielectrics depended on the plasma parameter, the direction and the drift velocity of the plasma flow. Potential difference has grown in a situation where very high energy particles such as the aurora electrons existed as a beam along a specific direction. We will report some of the results on the differential charging obtained in our simulations..

As a common method to mitigate the differential charging, a plasma emission is conducted from the spacecraft surface by using a plasma contactor. In order to examine the mitigation process by plasma contactor, we started performing electrostatic plasma simulations. In the current report, we will show some results obtained with a plasma emission of relatively low density. We will also discuss a numerical method to treat high density plasma emission.