

Numerical simulations of 500eV-50keV electron elastic collisions with neutral H₂O around Enceladus ~estimation of electron loss rate and auroral brightness~

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Saturn's inner magnetosphere is dominated by water group neutrals (H₂O, OH, and O) originated from Enceladus. Previous studies suggested that the neutrals contribute to loss processes of plasma in the inner magnetosphere. However, little has been reported on a quantitative study of the electron loss process due to electron-neutral collisions. *Tadokoro and Katoh* [2014] focused on the loss process of 1 keV electron through the elastic collision with neutral H₂O. They examined the time variations of equatorial electron pitch angle distribution and electrons within loss cone through 1 keV electron pitch angle scattering due to elastic collisions around Enceladus, conducting one dimensional test particle simulation. The result showed that the electrons of 11.4 % are lost in the time scale (~380 sec.) of the co-rotation of the flux tube passing through the region of the dense H₂O in the vicinity of Enceladus. The examination of elastic collisions with other electron energy is required to understand the electron loss process due to elastic collision.

We calculate the electron elastic collision in the energy range of 500 eV –50 keV. We show the electron loss rate into the atmosphere of Saturn and auroral brightness based on the loss rate.

Keywords: Saturn, Enceladus, test particle simulation, elastic collision, auroral brightness