

## Energy dependent electron pitch angle scattering due to elastic collisions in the neutral H<sub>2</sub>O Enceladus torus

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Water group neutrals (H<sub>2</sub>O, OH, and O) in Saturn's inner magnetosphere play the dominant role in loss of energetic electrons and ions because of abundance of the neutrals [e.g., *Paranicas et al.*, 2007, 2008; *Sittler et al.*, 2008]. The previous studies suggested that the neutral cloud originated from Enceladus contributes 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. In this study, we focus on the elastic collisional loss process with neutrals. Conducting one dimensional test-particle simulation, *Tadokoro et al.* [2014] examined the time variations of equatorial pitch angle distribution and electrons within loss cone through 1 keV electron pitch angle scattering due to electron-H<sub>2</sub>O elastic collisions around Enceladus when the electron flux tube passes the region of the dense H<sub>2</sub>O molecules in the vicinity of Enceladus (~380 sec). The result showed that the electrons of 11.4 % are lost in ~380 sec. Assuming the uniform azimuth H<sub>2</sub>O density structure in the torus, they also estimated the electron loss rate of 33 % during one corotation. Next remaining issue is a calculation of energy dependent electron loss rate. We show the loss rate of electrons with 500eV-50keV and the comparison of the loss rate between the high (in the vicinity of Enceladus) and low (in the Enceladus torus) H<sub>2</sub>O density regions.

Keywords: Enceladus torus, Saturn's magnetosphere, electron neutral collision, elastic collision, pitch angle scattering