Enceladus衛星H_2Oトーラス中の弾性衝突による電子ピッチ角散乱のエネルギー依存性

Energy dependent electron pitch angle scattering due to elastic collisions in the neutral H_2O Enceladus torus

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Water group neutrals (H_2O, 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_2O elastic collisions around Enceladus when the electron flux tube passes the region of the dense H_2O 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_2O 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_2O density regions.

キーワード：エンケラドストーラス、土星磁気圏、電子中性衝突、弾性衝突、ピッチ角散乱
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