



Charge Exchange and Ion Chemistry in the Gas Coma of Enceladus

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Enceladus, the small inner icy moon of Saturn, has been discovered by Cassini observations to be emitting a large quantity of water molecules ($Q \sim 10^{28}$ H₂O/s) from its south pole. Because of the low surface gravity, the expanding gas will move away from Enceladus forming a toroidal-shaped gas cloud around Saturn. In the dense region of the neutral atmosphere, the incoming magnetospheric plasma flow has strong interaction via charge exchange and collisional process. Because of the large amount of gaseous material surrounding Enceladus, the magnetospheric flow could be slowed down substantially in analogy to the comet-solar wind interaction. The new pickup ions and the fast neutrals generated by charge exchange process have long-ranging effects in the local and global structures and dynamics of the Saturnian magnetosphere. By using a simple flow model with a heritage from cometary study, we investigate the production of new water-group ions and fast neutral atoms and molecules in the vicinity of Enceladus. Some preliminary results will be reported here.