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Ions in the Plume of Enceladus and the Role of Grain Interactions SRIHARSHA POTHAPRAGADA, THOMAS CRAVENS, University of Kansas, NATALY OZAK, Weizmann Institute of Science, Rehovot, Israel, MIHÁLY HORÁNYI, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO, United States, SASCHA KEMPF, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO, United States, GERAINT JONES, Mullard Space Science Laboratory, University College of London, Holmbury St. Mary, United Kingdom — Data from instruments aboard the Cassini Orbiter indicate plumes of neutral gas and ice from the southern polar region on the Saturn's moon, Enceladus. Flyby missions through the plumes have measured plasma (both electron and ion) conditions and composition in addition to the magnetic field. INMS measurements point to H_3O^+ as the dominant ion species through rapid reaction of H_2O^+, OH^+, and O^+ species with neutral H_2O. CAPS has reported presence of both positive and negative ions along with measured water cluster ions. We present results from Monte Carlo/test particle simulations to model the ion distribution for different species in the Enceladus plumes. We have incorporated previously proposed models of the plume / atmosphere density and plasma flow around the satellite. Effects of charge exchange, photo-ionization and dust-grain collisional ionizations by the electron and ion distributions are included in the models. We aim to interpret Cassini data by understanding the contributions of each of these effects on the observed ion, neutral and electron fluxes.

Sriharsha Pothapragada
University of Kansas

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