Geophysical Research Abstracts
Vol. 14, EGU2012-7818, 2012
EGU General Assembly 2012

Modeling the satellite particles in planetary exospheres : application to Titan, Earth and Mars

A. Beth (1,2), A. Kotova (1,2), P. Garnier (1,2), D. Toublanc (1,2), I. Dandouras (1,2), P.C. Brandt (3), K. Dialynas (4,5), S.M. Krimigis (3,4)

(1) Université de Toulouse; UPS-OMP; IRAP; Toulouse, France, (2) CNRS; IRAP; 9 Av. colonel Roche, BP 44346, F-31028 Toulouse cedex 4, France, (3) Applied Physics Laboratory, Johns Hopkins University, Laurel, MD, USA, (4) Office for Space Research and Applications, Academy of Athens, Athens, Greece , (5) Department of Astrophysics, Astronomy and Mechanics, Faculty of Physics, National Kapodistrian University of Athens, Athens, Greece

The planetary exospheres are poorly known in their outer parts, since neutral densities are low compared with the instruments detection capabilities. Exospheric models are thus often the main source of information at such high altitudes. We revisit here the importance of a specific exospheric population, i.e. satellite particles, which is usually neglected in the models. These particles are indeed produced through rare collisions in the exospheres, and may either be negligible or dominate the exospheres of all planets with dense atmospheres in our solar system, depending on the balance between their sources and losses. At Titan, such calculations suggest a negligible contribution of H2 satellite populations compared to H2 ballistic populations, in contradiction with conclusions inferred from energetic neutral atom images by the Cassini MIMI/INCA imager. The application to Earth predicts that H satellite particles are the dominant population in the exosphere above 4 Earth radii , with a total density in agreement with recent IBEX observations. We finally show the first results for O particles in the Martian environment.