

Interaction of the Solar Wind with Comet C-G

J. L. Burch, R. Goldstein, P. Mokashi, T. Broiles, K. Mandt
Southwest Research Institute
San Antonio, TX

The Ion and Electron Sensor (IES) on the Rosetta Orbiter made nearly 3D measurements (2.8π steradians) of electrons and ions from 4 eV to 17 keV for the duration of the Rosetta mission. At low levels of cometary activity negatively-charged nanograins were observed to be ejected from the comet, picked up by the solar wind at large distances from the comet and returned to the vicinity of the comet at high energies, extending beyond the IES energy range. As the cometary coma developed, the newly observed double charge exchange of solar-wind protons produced negative hydrogen ions entrained in the solar wind. Pickup ions from the comet were observed to be deflected by the cometary environment with the amount of deflection being inversely proportional to ion mass as expected from momentum considerations. Electron acceleration, possibly by lower hybrid waves was observed close to the comet, but the detection of an associated bow shock was not achieved. The most dramatic effect near perihelion was the development of a diamagnetic cavity and of localized outbursts of gas from the comet. Both of these events had measurable effects on the plasma distributions. These results, as well as several newly-observed phenomena, are discussed in this paper.