Langmuir waves detected by the Juno Waves instrument upstream of the Jovian bow shock

George B. Hospodarsky*[1], William S. Kurth[1], Donald A. Gurnett[1],
Scott J. Bolton[2], Steven M. Levin[3], John E. P. Connerney[4]
[1]Department of Physics and Astronomy, University of Iowa, Iowa City, IA
[2]Southwest Research Institute, San Antonio, TX
[3]Jet Propulsion Laboratory, Pasadena, CA
[4]NASA Goddard Space Flight Center, Greenbelt, MD

Langmuir waves (also known as electron plasma oscillations) are commonly observed in the solar wind upstream of planetary bow shocks. Solar wind electrons are reflected and accelerated at the shock boundary, creating electron beams that flow back into the solar wind. These electron beams can generating electrostatic Langmuir waves. The occurrence and characteristic of these waves provide information about the properties of the solar wind and its interaction with a planets magnetosphere. For example, the frequency of the Langmuir waves provides an estimate of the local electron density. Although a large number of spacecraft have investigated Langmuir waves near the Earth, the number of observations upstream of the outer planets are limited. The Juno mission to Jupiter provides a new opportunity to investigate the characteristics of Langmuir waves detected upstream of Jupiter. The Juno spacecraft detected Langmuir waves both during the approach to Jupiter prior to the successful orbit insertion on July 5, 2016, and near apogee of the initial capture orbits. The characteristics of the waves detected by Juno upstream of Jupiter will be examined and compared to the previous observations at Jupiter by other spacecraft, and to observations of Langmuir waves upstream of Venus, Earth and Saturn.