Geophysical Research Abstracts
Vol. 19, EGU2017-6003, 2017
EGU General Assembly 2017

Jupiter's Decameter Radiation as Viewed from Juno, Cassini, WIND, STEREO A, and Earth-Based Radio Observatories

Masafumi Imai (1), William S. Kurth (1), George B. Hospodarsky (1), Scott J. Bolton (2), John E. P. Connerney (3), Steven M. Levin (4), Tracy E. Clarke (5), and Charles A. Higgins (6)

(1) University of Iowa, Iowa City, Iowa, United States (masafumi-imai@uiowa.edu), (2) Southwest Research Institute, San Antonio, Texas, United States, (3) NASA Goddard Space Flight Center, Greenbelt, Maryland, United States, (4) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, United States, (5) Naval Research Laboratory, Washington, DC, United States, (6) Middle Tennessee State University, Murfreesboro, Tennessee, United States

Jupiter is the dominant auroral radio source in our solar system, producing decameter (DAM) radiation (from a few to 40 MHz) with a flux density of up to 10^{-19} W/(m^{2}Hz). Jovian DAM non-thermal radiation above 10 MHz is readily observed by Earth-based radio telescopes that are limited at lower frequencies by terrestrial ionospheric conditions and radio frequency interference. In contrast, frequencies observed by spacecraft depend upon receiver capability and the ambient solar wind plasma frequency. Observations of DAM from widely separated observers can be used to investigate the geometrical properties of the beam and learn about the generation mechanism. The first multi-observer observations of Jovian DAM emission were made using the Voyager spacecraft and ground-based radio telescopes in early 1979, but, due to geometrical constraints and limited flyby duration, a full understanding of the latitudinal beaming of Jovian DAM radiation remains elusive. This understanding is sorely needed to confirm DAM generation by the electron cyclotron maser instability, the widely assumed generation mechanism. Juno first detected Jovian DAM emissions on May 5, 2016, on approach to the Jovian system, initiating a new opportunity to perform observations of Jovian DAM radiation with Juno, Cassini, WIND, STEREO A, and Earth-based radio observatories (Long Wavelength Array Station One (LWA1) in New Mexico, USA, and Nançay Decameter Array (NDA) in France). These observers are widely distributed throughout our solar system and span a broad frequency range of 3.5 to 40.5 MHz. Juno resides in orbit at Jupiter, Cassini at Saturn, WIND around Earth, STEREO A in 1 AU orbit, and LWA1 and NDA at Earth. Juno's unique polar trajectory is expected to facilitate extraordinary stereoscopic observations of Jovian DAM, leading to a much improved understanding of the latitudinal beaming of Jovian DAM.