

First Observations Near Jupiter by the Juno Waves Investigation

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The Juno spacecraft successfully entered a polar orbit of Jupiter on 5 July 2016. One of Juno's primary objectives is to explore Jupiter's polar magnetosphere for the first time. An obvious major aspect of this exploration includes remote and in situ observations of Jupiter's auroras and the processes responsible for them. To this end, Juno carries a suite of particle, field, and remote sensing instruments. One of these instruments is a radio and plasma wave instrument called Waves, designed to detect one electric field component of waves in the frequency range of 50 Hz to 40 MHz and one magnetic field component of waves in the range of 50 Hz to 20 kHz. Waves made observations of upstream plasma waves such as electron plasma oscillations and ion acoustic waves in Jupiter's foreshock beginning nearly 1 AU from Jupiter. The instrument recorded clear signatures of the bow shock and magnetopause crossings both on approach and during its two 53.5-day capture orbits. At higher frequencies, kilometric, hectometric, and decametric emissions are regularly observed. Juno's first perijove pass with science observations occurred on 27 August 2016 and revealed a number of radio and plasma wave phenomena anticipated based on terrestrial studies. Juno passed through or very close to the source region of broadband kilometric radiation and decametric radiation, representing the most intense planetary radio emissions in the solar system. In this paper we will provide an overview of early observations from the Juno Waves investigation in the context of expectations based on what we know from the terrestrial aurora.