

EXPLORATION OF JUPITER'S POLAR MAGNETOSPHERE AND RADIO EMISSIONS WITH THE JUNO MISSION

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Abstract

Juno is the next mission to Jupiter. Juno's overarching scientific goal is to understand the origin and evolution of Jupiter. As the archetype of giant planets, Jupiter holds the key to understanding the origin of our own solar system and the origin of the extra-solar planetary systems now being discovered around other stars. Juno's investigation of Jupiter focuses on four themes: Origin, Interior Structure, Atmospheric Composition and Dynamics, and the Polar Magnetosphere.

Juno's scientific measurements include global maps of the gravity and magnetic fields, microwave radiometry of Jupiter's deep atmosphere and a full suite of fields and particles measurements of Jupiter's polar magnetosphere. Juno's 32 polar orbits extensively sample Jupiter's full range of latitudes and longitudes. High sensitivity radiometric measurements yields information on Jupiter's deep atmosphere (down to ~ 1000 bars) which will be used to infer the global abundance of water, and to investigate the complex meteorology of Jupiter's atmosphere. Determining the Jovian water abundance and whether a solid core exists within Jupiter permits discrimination between various scenarios of the formation of Jupiter. The gravity data constrain the planet's interior rotation, core size and interior structure. The magnetic field measurements investigate how the interior dynamo works and examine the depth of generation of Jupiter's powerful magnetic field. Fields and particles measurements as well as UV and IR polar images investigate Jupiter's auroral physics to determine what drives Jupiter's remarkable northern and southern lights.

An overview of the mission and science objectives will be presented with an emphasis on Juno's investigation of Jupiter's polar magnetosphere and radio emission.

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