Space Physics Seminar

Thursday, February 16, 2017

First Results of the Juno Mission in Jupiter's Magnetosphere

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The Juno spacecraft entered polar orbit about Jupiter on July 4, 2016, after a Jupiter Orbit Insertion (JOI) main engine burn lasting 35 minutes. Juno's science instruments were not powered during the critical maneuver sequence (~5 days) but were fully operational shortly thereafter. Juno's current 53.5 day polar orbit spans the Jovian magnetosphere from bow shock (>100 Rj) to the planet (periapsis at 1.06 Rj) and back, providing magnetic field, charged particle, and wave phenomena context for the passage over the poles and first traverse of Jupiter's hazardous inner radiation belts. Juno's energetic particle and plasma detectors made the first measurements of electrons precipitating in the polar regions, exciting intense ultraviolet (UV) and infrared (IR) auroras, also observed simultaneously by Juno's UV and IR imaging spectrographs. Juno transited beneath the most intense parts of the radiation belts, passed a few thousand kilometers above the cloudtops at closest approach, and recorded the electrical signatures of high velocity impacts with small particles as it traversed the Jovigraphic equator. The first few periapsis passes revealed an extraordinary spatial variation of the magnetic field close to the planet's surface, suggesting that Juno may be sampling the field closer to the dynamo region than widely anticipated, i.e., portending a dynamo surface extending to relatively large radial distance (~0.9Rj?). Global mapping of the gravity and magnetic fields will continue until some 32 periapsis passes are acquired, evenly spaced in longitude about the planet, wrapping Jupiter in a dense net of observations ideally suited to characterizing the magnetic field. When finished, Juno will have painted the most detailed image of the field at a dynamo surface – with more resolution than one can achieve in orbit about Earth.

C·S·P

4:00pm in CAS 502. *Refreshments served at 3:45pm in CAS 500.*

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Next Week

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