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## The innermost ion radiation belts of Jupiter and Saturn

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The ion radiation belts just above the surface of the giant planets Jupiter and Saturn have recently been observed for the first time with Juno and Cassini. The relevant physical processes differ from Earth's inner proton belt. Jupiter's innermost ion belt consists of protons, oxygen, and sulfur ions. A comparison of Juno particle and plasma data with numerical modeling supports that these ions are occasionally transported from the magnetosphere across the main ring of Jupiter. It has been suggested earlier that this ring is populated through the stripping of energetic neutral atoms that are produced in the magnetosphere. This process is found to be too slow to populate the belt. After radial transport, the new ions lose energy in the tenuous ring halo inward of the main ring. This gives rise to an unusual spectral shape that rises from 100keV to 1MeV. Neutralization of the ions in the ring grains acts slower and eventually removes <100keV ions until the next transport across the ring.

Saturn's innermost belt differs from Jupiter's and Earth's inner belts in the sense that Saturn's rings are too dense and extended to allow radial transport of magnetospheric ions into the innermost belt. Saturn's ion belts are therefore thought to be exclusively populated by cosmic ray tertiary particles from the CRAND process. While the source is different, the losses are similar as at Jupiter, namely interaction with the tenuous D-ring and the planetary exosphere. This interaction shows in the proton pitch angle distribution and has been used to constrain the scale height of Saturn's exosphere that is difficult to do otherwise.