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Energetic particles and waves in the Jupiter's and Saturn's radiation belts

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The radiation belts of Jupiter and Saturn are among the harshest environments in our solar system. In extremely strong internal closed magnetic field configurations energetic particles up to several hundred MeV energies are trapped and bounce back and forth along the magnetic field lines emitting waves in a whole variety of frequencies. Charged particle drift paths in the rotationally-dominated magnetospheres close around the whole planet to substantial planetary distances, unlike in the case of Earth. The combination of a strong internal magnetic field and quasi-stable trapping allows the fluxes of energetic ions and electrons to become very large.
In this presentation the available in-situ measurements of Jupiter's and Saturn's radiation belts are reviewed as well as current modelling approaches. In addition some aspects of the expected measurements of the Jovian radiation belts from the upcoming JUNO mission will be discussed.