

Saturn's radio, UV and IR aurorae observed simultaneously by Cassini

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Abstract

Similarly to other magnetized planets, auroral electrons gyrating around high latitude magnetic field lines generate powerful emissions at Saturn. They divide into Ultraviolet (UV) and Infrared (IR) aurorae, originating from electron collisions with the upper atmosphere, and Saturn's Kilometric Radiation (SKR), radiated by resonant interactions with electrons at higher altitudes. Previous studies have established a conjugacy at first order between radio and UV, as well as IR and UV kronian aurorae.

Here, we investigate two days of simultaneous observations of Saturn's auroral emissions in radio, UV and IR wavelengths, thanks to the Cassini RPWS, UVIS and VIMS instruments. We analyze quantitatively complementary informations brought by these different processes in terms of active magnetic field lines, radiated power and dynamics, together with their relationship with a reservoir of equatorial energetic particles co-rotating with the planet, mapped by energetic neutral atoms detected by the INCA instrument.