Cassini Grand Finale: New insights on the source of Saturn Kilometric Radiation

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The Cassini mission ended on 15 Sept. 2017 with a spectacular entry of the spacecraft into Saturn's atmosphere. After having been in orbit around the planet for 13 years, the latest part of its orbital tour around the planet consisted of 20 ring-grazing orbits and 22 proximal orbits. Each of these orbits provided a unique opportunity to sample the kronian auroral region region twice, on the northern dawnside on the inbound and the southern duskside on the outbound, respectively. Cassini first acquired in situ measurements with its suite of plasma instruments, sampling the magnetic field and the various populations of particles. In parallel, the Cassini spectro-imagers and the Hubble Space Telescope remotely monitored the auroral context at optical wavelengths. In this presentation, we will present an overview of Cassini/RPWS measurements within or close to the sources of Saturnian Kilometric Radiation (SKR) identified so far to update our current knowledge on them, which relies on 2 isolated passes within SKR southern sources in 2008. We will address in particular the wave properties, the existence of plasma cavities and the relationship between radio sources and acceleration regions. We also take advantage of continuous remote observations at high latitudes to derive updated SKR periodicities in both hemispheres up to the northern solstice, where the solar illumination on the northern auroral region will culminate. The existence of two periods of SKR rotational modulation, slightly different in both hemisphere and both varying with time indeed remain one of the most puzzling question for the community.