



## **Saturn and Its Satellites and Rings Viewed through the Infrared Eyes of Cassini CIRS**

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CIRS thermal-infrared spectra have been used to retrieve temperatures and atmospheric composition within the Saturn system. We discuss several major findings, including: SATURN a) The outburst of a major storm at northern latitudes, resulting in a depletion of tropospheric phosphine and para-hydrogen, and a perturbed stratosphere, characterized by anticyclonic structure with high-temperatures, associated with large-amplitude vertical motions, and enhanced ethylene. The perturbed structure of the stratosphere is long-lived, persisting long after the visible tropospheric disturbance has decayed. b) The structure and descending pattern of a stratospheric oscillation at the equator. c) Evidence for descent over both winter and summer poles, leading to warm temperatures and depleted phosphine. TITAN a) The structure and seasonal behavior of the circumpolar vortices, as seen in temperatures, zonal winds, trace gas distribution, and condensates. b) The polar offset of cyclostrophic flow in the stratosphere. c) The spatial variation of stratospheric methane. d) The meridional and seasonal variation of surface temperatures. e) A new hydrocarbon unearthed: first detection of propylene. RINGS. a) The existence of a population of ring particles in the main rings that are relatively large, spin slowly, and have a low enough thermal inertia to provide a thermal response that is rapid compared to the particle rotation period. b) The determination of minimum ring temperatures, seen at equinox. ICY SATELLITES a) The discovery of warm temperatures and endogenic thermal emission in the major fissures around Enceladus's south pole. b) The identification of the pac-man features on Mimas and Tethys, indicative of variations in thermal inertia that are likely caused by electron bombardment over the course of the satellites' orbits.