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# Cassini CIRS Observations of Temperatures in Saturn's Main Rings with Changing Viewing Geometry

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Over the last two years spatially resolved thermal infrared scans of Saturn's main rings (A, B and C, and Cassini Division) were obtained by the Cassini Composite Infrared Spectrometer (CIRS) over a broad range of thermal wavelengths, from 7 microns to 1 mm (1400 to 10 cm-1). Temperatures were retrieved for the lit and unlit rings over a variety of ring geometries, including phase angle, local hour angle and ring opening angle. Phase angles varied from 0 degrees to 178 degrees, and ring emission angles varied from only a few degrees to 50 degrees.

Physical temperatures derived from the spectra vary with local hour angle as well as viewing geometry within each main ring. The phase angle is the largest contributor with the largest ring temperatures being measured at a phase angle of zero degrees. Ring temperatures decrease with increasing phase angle on both the lit and unlit sides of the rings, indicative of the presence of a population of relatively large, fairly slowly spinning ring particles.

The A ring shows the smallest temperature variation with phase angle, and this variation decreases with increasing ring radius. This decrease in thermal contrast suggests a larger number of smaller, and/or more rapidly rotating ring particles which have more uniform temperatures with phase angle, resulting perhaps from stirring by density waves and gravitational wakes.

The variation in temperature with local hour angle is most pronounced in the C ring, close to Saturn, and decreases with increasing radial distance from the planet, however, to date, the observed variation in temperature with increasing ring emission angle is

very small. The results of our first look at this data set as a whole will be presented.

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