Geophysical Research Abstracts, Vol. 9, 04735, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-04735

Three years of CASSINI/CIRS observations of Saturn's rings : the azimuthal scans perspective

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The CASSINI composite infrared spectrometer (CIRS) has obtained a large number of thermal infrared spectra of Saturn's rings since the Saturn's orbit insertion (SOI) in July 2004. Over the two and half years of observations to date, ring temperatures were retrieved for a large range of geometry of observations. Different acquisition strategies are used, including radial scans obtained at a constant ring local time, azimuthal scans where rings are scanned at a constant radial distance, and long integration in which the instrument field of view stares at the same region of rings in the inertial frame during acquisition of several spectra.

Each observation type is linked to a set of specific scientific goal. Here, we present an overview of all azimuthal scan obtained by the CASSINI/CIRS instrument so far. At a constant geometry of observation, the ring temperature varies with longitude as the input heating flux coming from Saturn and the Sun change. The drastic cooling down of ring particles in the planetary shadow could indicates a low thermal inertia for particle regoliths, but should also depend on the dynamical properties of particles (Ferrari & Leyrat, 2006). The decrease of temperature with the increasing phase angle on both the lit and unlit ring side and for most of local time, suggests also the presence of slowly rotating particles.

The CASSINI/CIRS azimuthal scans data set is therefore a crucial input for any future modeling of Saturn's rings thermal and dynamical properties. We identify and quantify the influence of observational parameters in the azimuthal temperature modulations, such as the phase angle, the ring emission angle, the local time, etc, and discuss the

resulting constraints on physical properties of the rings.