

Radiance from comet aerosols: Application to 67P/ Churymov-Gerasimenko

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Abstract

The study of dust/ice and gas of the coma is the main goal of the VIRTIS (Visible and Infrared Thermal Imaging Spectrometer), an imaging spectrometer onboard of the Rosetta spacecraft. The airborne dust and ice are an important constituents of cometary environment. In fact the cometary spectra are strongly affected by the processes involving these particles and their properties. The solar light illuminates the aerosols that can scatter, absorb and emit radiation. The reflected and the emitted radiation, has been modeled using a line by line code (N.I Ignatiev et al., 2005). This allows us to understand and define the dust and ice properties of Churymov-Gerasimenko comet in the spectral range 0.25-5 μm .

The synthetic spectra are computed at different distances from the sun and with different aerosol models (size distribution, composition and vertical distribution), taken from the literature. The distance (1.3-3.5 AU) from the sun changes because the Rosetta orbiter varies its observational conditions. The gaseous distribution and properties of the coma are provided by the Inner Coma Environment Simulation tools (ICES).

Another important topic for this work is to use the resulting synthetic spectra in order to define an observing strategy for Rosetta-VIRTIS instrument because during the mission the observation conditions change due to different relative positions spacecraft/comet/sun.