First observations of Jupiter Aurorae by JIRAM on board Juno.

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JIRAM (Jovian Infrared Auroral Mapper) is an imager/spectrometer on board Juno. One of its main scientific goals is to get detailed coverage of the jovian aurorae from pole to pole, taking advantage of the highly elliptical polar orbit of the Juno spacecraft.

Among the various molecular ions that emit in the electron-driven Jupiter's aurora, only H3+ is observable in the JIRAM spectral range. Its main roto-vibrational band is around 2521 1/cm, composed of more than 200 possible transitions in the range 3.0-5.0 μm; observation of the infrared emission of H3+ is mainly possible in a spectral interval (3.2 to 4.0 μm) where the solar and thermal radiance emitted by the planet is very low due to intense atmospheric methane absorption band, resulting in high auroral contrast against Jupiter's dark disk.

Hence, JIRAM is composed of both a 2-D IR imager and a 1-D spectrometer channel in the range 2-5 um with a spectral resolution of about 9 nm and surface resolution as low as 50 km. One of the two imager channels is centered at 3.455 μm (in the H3+ emission region), to give a context information of auroral emission, along with the spectrometer detailed measurement.

In this presentation we show the first results on JIRAM's observations of the H3+ infrared emission, taken around the first Juno pericenter (August 2016) after orbit insertion. These observations provide spatial, spectral and temporal distribution of the Jovian auroras. In the near future, slant and limb observations of H3+ emission will allow the study of the vertical distribution of H3+ density and temperature profile in the thermosphere.