



Io's SO₂ atmosphere: spatial distribution from millimetric interferometric observations

A. Moullet (1), E. Lellouch (1), R. Moreno (1), M.A. Gurwell (2)

1. LESIA - Observatoire de Paris, Meudon, France
2. Harvard-Smithsonian CFA, Cambridge, USA

(arielle.moullet@obspm.fr / Phone: 00331 45 07 77 46)

We report on millimeter-wave observations of Io performed with the Plateau de Bure interferometer. We used a compact configuration, providing a 0.5×1.5 arcsec HPHW synthesized beam, allowing resolution of the Io disk in the longitudinal direction. The observations were performed on January 28 and February 5, 2005, recording data on the leading side (central longitudes from 70° to 120° W) and on the trailing side (from 245° to 310° W).

Continuum analysis of the data in the UV plane indicates a 10% surface temperature difference between the two sides, the leading side being colder than the trailing side. The mean surface temperature is 100K, lower than surface temperature inferred by IR observations. The data further indicate a weak longitudinal temperature variation. Both aspects are consistent with subsurface sounding.

The SO₂ 216.643 GHz emission feature is detected on both hemispheres, with its contrast higher (by approx. 70%) on the leading side than on the trailing side. Interferometric maps also show that the SO₂ emission is shifted with respect to the continuum emission on the leading side.

We will present the data and their first interpretation in terms of a spatially variable distribution of SO₂ column densities and temperature. Ultimately, the goal is to distinguish between volcanic plumes and a sublimation-supported atmosphere.