



Characterizing the Venus atmospheric dynamics from ground-based Doppler velocimetry

Pedro Machado (1,2), David Luz (1), Thomas Widemann (2), Emmanuel Lellouch (2), Olivier Witasse (3), and Jean-Loup Bertaux (4)

(1) University of Lisbon Center for Astronomy and Astrophysics (CAAUL), Portugal (machado@oal.ul.pt), (2) Observatoire de Paris-Meudon (LESIA), Paris, France, (3) ESA/ESTEC, Noordwijk, The Netherlands, (4) LATMOS/IPSL, Paris, France

We present an analysis of observations of Venus made with the UVES instrument (Ultraviolet and Visual Echelle Spectrograph) at ESO's Very Large Telescope (VLT). The observations were carried out in May and June 2007 with the aim of characterizing the zonal wind flow in the atmosphere of Venus during the nominal mission phase of Venus Express.

Doppler velocimetry measurements are based on solar Fraunhofer lines in the visible, probing the cloud tops velocity close to 65 km altitude. The narrow slit width of the UVES instrument, combined with the large apparent angular size of the planet, allows to simultaneously achieve high spectral resolving power and high spatial resolution.

The observations were made at a central wavelength of 580 nm with the UVES red arm and at 437 and 860 nm in dichroic mode, using both the blue and red arms. In one observation block the field has been derotated in order to align the 0.3-arcsec aperture perpendicularly to Venus's rotation axis, while in other observations it was aligned parallel to it. In each case, spatial information, respectively in the East-West and in the North-South direction, is preserved in the spectra in the direction perpendicular to dispersion, allowing to spatially resolve relative variations in atmospheric rotation.

We estimate both the relative variations of the atmospheric rotation with latitude and the hemispheric asymmetry of the zonal wind between 35S and 35N. The absolute magnitude of the zonal winds at latitudes of 23S, 13S and 2S has also been determined.

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