



Measurements of Zonal Winds on Mars at winter solstice from Millimeter Interferometric Observations

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On September 17 and December 16, 2003, we observed Mars with the IRAM Plateau de Bure Interferometer (PdBI). Observations were obtained in the CO(2–1) and CO(1–0) rotational lines at 230.538 and 115.271 GHz respectively, with a spectral resolution up to 40 kHz. Mars' average angular size was equal to 23 and 9.5 arcsec and the spatial resolution in our CO(1–0) maps permit to resolve Mars in about 4*4 independent point. The observations sampled the period Ls=262 and Ls=317.

The high spectral resolution allowed us to determine and map Doppler shifts – especially in the (1–0) line where the signal-to-noise is much higher than in the CO(2–1) line – and therefore to directly investigate Mars' middle atmosphere (near 50 km) circulation. We already obtained such wind measurements on Mars with the PdBI (Moreno et al 1999, BAAS, 31, 1149), and found a strong retrograde flow at summer's end (Ls=140), which was at odds with Mars General Circulation Models (GCMs) which rather predict a weak prograde flow for this season. These new measurements will therefore provide additional constraints to Mars GCMs in the poorly characterized middle-atmosphere. Preliminary wind results will be presented.