

Wind field estimation at 5.0 μm by Juno/JIRAM imaging of Jupiter's poles

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Abstract

During the JP4 pass on Feb 2nd 2017 the Jovian InfraRed Auroral Mapper (JIRAM, [1]) got many observations of the two Jupiter's poles when the Juno spacecraft at perijove passed at very short distance from the planet. The spatial resolutions of the acquired images ranged from 14 to 90 km/px. The JIRAM imager channel in M band – centered at 4.780 μm with a 480 nm bandwidth – revealed a complex structure of vortices surrounding the two poles. Northern and southern patterns showed a different number of eddies organized in quasi-octagonal and pentagonal geometrical shapes. We apply the optical technique of Particle Image Velocimetry (PIV) to some of the JIRAM images of the two poles to investigate the wind field responsible of those patterns. PIV provides information about the distribution of the two cartesian velocity components of the flow, searching corresponding pixel patterns in two or more successive images and using cross-correlation. We employ the projections of the JIRAM geo-referenced data on a stereo polar plane as measurement plane.

In this work, we present the wind field estimation for two northern and southern Jupiter's polar regions and report in detail the procedure pipeline used to build coherent images for the PIV analysis from the JIRAM imager M acquisitions.

Acknowledgements

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References

[1] Adriani et al. (2014), JIRAM, the Jovian Infrared Auroral Mapper. *Space Sci. Rev.*, doi 10.1007/s11214-014-0094-y.