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Estimation of the emission cone width of Jovian DAM using STEREO/WAVES observations.

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Abstract

The SWAVES experiment onboard the Solar TErrestrial RElations Observatory (STEREO) is mainly dedicated to measuring solar radio emission, but also provides unique stereoscopic observations of the Jovian radio emission in a frequency range from a few kHz up to 16 MHz. Stereoscopic observations provided by STEREO-A and -B allow to unambiguously determinate sources of the observed radio emissions from the dynamic spectra by means of the knowledge of the time delay between sequential detection of the radio bursts from the same source, i.e. solar radio bursts, Jovian Io dependent or Io independent DAM.

Using the limited number of the stereoscopic observations of the Jovian radio emission from Wind and Cassini, Kaiser et al. [2000] determined the thickness of the hollow cone of the DAM emission by means of correlation analysis of the observed spectra. In particular, it has been found that the averaged emission cone wall thickness is approximately 1.5 degree. The angular separation, as seen from Jupiter, between the two STEREO spacecraft, orbiting the Sun, approximately twice per year is less than 2.5 degree during several time spans from 2007-2009. Therefore, the method described in Kaiser et al. [2000] is applied to determine the statistically confident results of the beaming width of the Io and non-Io DAM observed during this time. Altogether 70 radio events, in particular 49 Io- and 21 non-Io-related radio events have been observed. We have determined the averaged width of the emission cone wall for Io- and non-Io events as of about 1 degree. These results confirm the previous findings.

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References

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