# LWA1 で観測された木星電波モジュレーションレーンについて

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# Jupiter's decametric modulation lanes observed by LWA1

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The Long Wavelength Array (LWA) is a low-frequency radio telescope designed to produce high-sensitivity, high-resolution images in the frequency range of 10-88 MHz. The Long Wavelength Array Station 1 (LWA1) is the first LWA station completed in April 2011, and is located near the VLA site in New Mexico, USA. LWA1 consists of a 256 element array, operating as a single-station telescope. Each LWA1 beam provides dual orthogonal linear polarizations such that it is possible to reconstruct the full Stokes parameters for each tuning.

The modulation lanes in Jupiter's decametric radiation, which were discovered by Riihimaa [1968], are groups of sloping parallel strips of alternately increased and decreased intensity in the dynamic spectral plots. In the Imai et al. [1992a, 1992b, 1997] model for the production of modulation lanes, the lanes are assumed to be a manifestation of interference fringes from the line source consisting of the points along the axis of the Io-activated flux tube. We show that the modulation lane method is a powerful tool to determine the important parameters of Jupiter's radio sources [Imai et al., 2002].

We present LWA1 observations of modulations lanes detected across a Jovian decametric Io-C burst that contains both right and left hand circular emission. The modulation lanes cross both handedness of polarization, may suggest that the emissions may be coming from the same hemisphere. Our data show similar powers for both hands of polarization which may imply that other processes are necessary to explain the L-O emission, like refractions, reflections, or mode conversions. Alternately, if the emissions are coming from opposite hemispheres, the propagation paths of each source emission through an interference screen that comprises of field-aligned columns of enhanced plasma density from the Io torus would need to be remarkably similar to form the continuous modulation lanes across both polarizations. These results add important information for our understanding of the emission mechanism at Jupiter.