Towards planar phaseless near-field measurements of ESA's JUICE mission 600 GHz SWI reflector antenna

The Submillimeter Wave Instrument is a 600GHz spectrometer with a 30cm reflector antenna, part of the payload of the ESA JUICE mission. Due to the difficulty of producing reliable phase measurements at such high frequency a phaseless planar nearfield measurement based on the Iterative Fourier Technique (IFT) is explored. The IFT is a well-known technique which has shown good results with aperture-type antennas; furthermore, probe correction has been demonstrated to be possible in one experimental case. In this paper a series of numerical results are presented pointing to the feasibility of a phaseless planar measurement for the SWI. In particular, the effect of the initial guess is evaluated with an accurate guess leading to exceptional results and a very simple constant-phase guess resulting in a less accurate result, but still remarkably accurate for the main beam. Additional simulations concern the use of coarser spatial sampling rates, showing that the sampling spacing can be increased to 32λ without significant aliasing error in the main beam, owing to the the high directivity of the SWI. Results from preliminary experimental investigations will also be reported, if available, at the time of the presentation.

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