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The Impact of Beam Convolution on Mapmaking

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With the recent development of projects for the gathering of cosmological data through radioastronomy, mainly using the redshifted 21 cm signal line, various systematic effects have been analysed to improve sensibility and precision. This includes instrumental features such as beam analysis, which involves studying the how the reflectors modify the data through optical aberrations, and how it is possible to adequately handle this issue. Usually, in literature, only the beam main lobe's effects are considered and taken out of the final results, but it is known that sidelobe residuals remain on the final data. In this work, I present the impact of sidelobe contamination on sky maps using the framework of the BINGO Telescope's reflectors and its 28 horns. This is achieved using a Zernike Polynomials decomposition of the beams, inserted into the HIDE & SEEK softwares, which perform survey simulations and mapmaking.

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