

Design of optical components

Nowadays there is a considerable scientific interest in increasing the field of view of submillimeter wave observatories in order to enable a much faster wide field mapping. This would enable telescopes to survey large regions of molecular clouds and image nearby galaxies.

We present our study of multi-pixel architectures that could allow for orders of magnitude increase in mapping speeds, thus significantly expanding the capabilities of current facilities like the ALMA observatory. The results of the study will be useful also in the development of future sub-mm single dish facilities, such as ATLAST, which aims at the delivery of a new and deeper insight of the submillimeter sky. Indeed, the development of focal plane arrays would significantly enlarge the fraction of the sky covered in a single observation, thus enabling the mapping of thousands of radio sources in a reasonable time.

The purpose of our study is the design of a multipixel array horn aperture focal plane that ensures a high polarization purity, reduced aberrations for off-axis beams and as compact as possible to satisfy the technical specifications based on scientific requirements and engineering constraints on weight, size and thermal load, which represent a serious technological challenge.

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Session Classification: Arrays

Track Classification: ALMA-FED 2021 Contributions: Invited Talks