



Contribution ID: 236

Type: Oral Presentation

Measuring and correcting primary beam instability in radio interferometry

Wednesday, 10 July 2013 14:30 (20 minutes)

Abstract content
 (Max 300 words)

An ideal interferometer assumes that the primary beam patterns of all antennas are to first order identical, pointed in exactly the same direction, and stable during the time of the observation. In practice this is not true for several reasons (a) parallactic rotation in an alt-az mount, (b) pointing errors, and (c) mechanical deformations of the telescope structure. This causes direction-dependent calibration errors, which result in dynamic-range-limiting artefacts in the images. In the first phase of this project, we will quantify this effect via simulations, answering questions such as, how much deviation from the ideal primary beam can we tolerate to keep the resulting errors within a certain budget. In the second phase, we will build on existing approaches (such as pointing error solutions) to find new methods for solving and correcting for primary beam deformations directly from the interferometric data itself.

Apply to be
 considered for a student
 award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
 PhD)?

PhD

Main supervisor (name and email)
and his / her institution

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Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

No

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Session Classification: Astro

Track Classification: Track D1 - Astrophysics