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Netherlands Institute for Radio Astronomy

Combining BF&IMG observing modes (D6) – The Solar case.





6th LOFAR Data School

STELLAR



Pietro Zucca - ASTRON











- Solar and Heliosphere observing modes
- Tied array Beam and Interferometric for the Sun
- Demo and Tutorial of data handling (P. Zhang)
 - More tutorials on Wednesday
 - Heliosphere cases on Friday









Solar and Space Weather KSP













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Image credits: A. Corstanje, F. Sweijen, C. Van Eck, P. Zucca



LOFAR KSP Observing mode

CORE + Remote Interferometric



Internationals IPS + RM DM Pulsars

Core Stations Tied Array Beam





LOFAR KSP Observing mode

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Tied-Array beam mode











A set of beams in an array around the Sun in order to recreate a micropixel map.

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Interferometric

- Calibrated Flux



Spatial resolution and quality of the imaging Complex sources with multiple peaks

Tied-Array

 Limited spatial resolution (beam spacing and size) Localization of the radio source without clear shape of the source Uncalibrated Flux











Tied-Array Time resolution (milliseconds) Advantage for quasi-relativistic beam propagation



Interferometric

 Limited time resolution (0.25 seconds) Not ideal for quasi-relativistic beam propagation











14:17

14:18



14:22

14:21

14:20

14:19

Time (UT) on 2019-03-21

46.3 MHz

60.9 MHz

70.3 MHz



Zucca, Zhang, Morosan Reid et al. A&A in prep.





Importance of Remote stations



Data School

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Start Time: 2014-08-25 14:40:00



<ObsID>_SAP<number>_BEAM<number>_S<number>_P<number>.h5 <ObsID>_SAP<number>_BEAM<number>_S<number>_P<number>.raw

L646143_SAP001_BEAM009_S1_P000.h5 L646143_SAP001_BEAM009_S1_P000.raw

https://support.astron.nl/LOFARBeamformedCookbook/introduction.html











Image credits: A. Corstanje, F. Sweijen, C. Van Eck, P. Zuco

Data types - Interferometric





L783845_SAP001_SB060_uv.MS









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Demo and Tutorial





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