

First long-baseline maps

LOFAR status meeting

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Argelander-
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für
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First light of the OvB Telescope

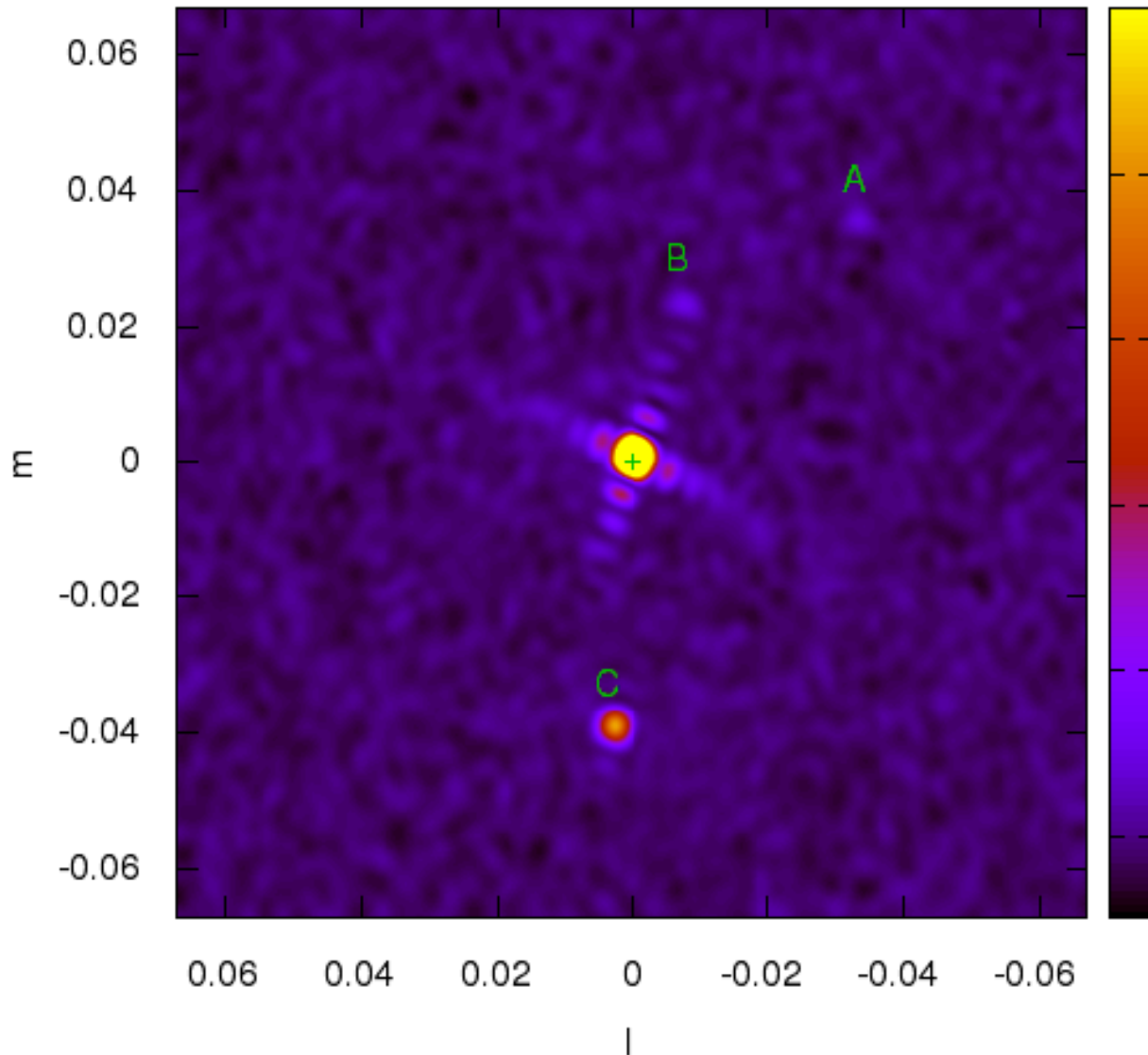
- delay/rate map
- conversion to circular polarisation
- short baseline map
- long baseline maps

[George v. Heald]



Fringe rate / delay map of field around 3C196

DE601LBA-DE602LBA pol 0(XX) incoherent multi-band



baseline Effelsberg –
Unterweilenbach

VLSS (74 MHz):

A 19 Jy

B 6 Jy

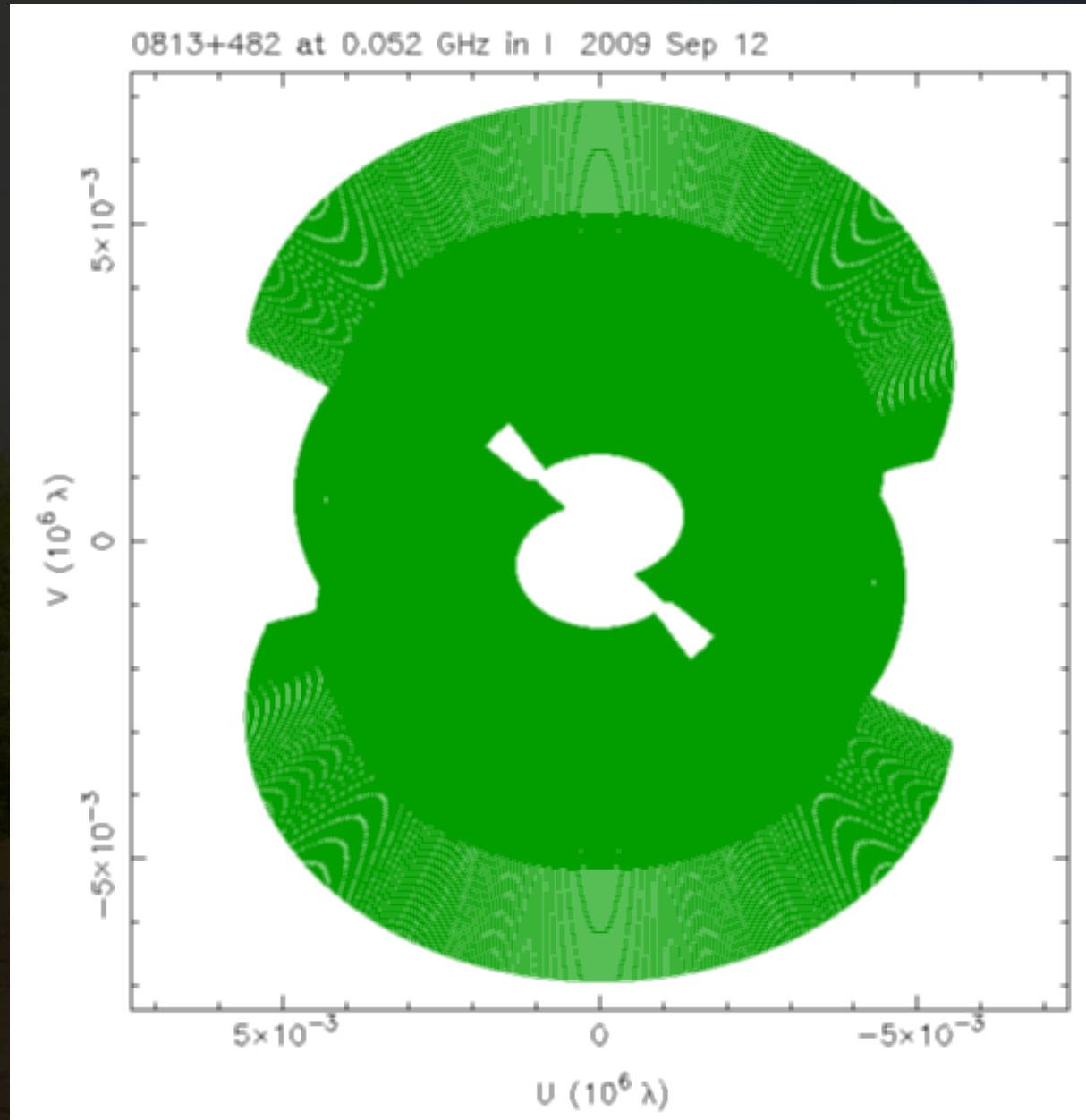
C 17 Jy

3C196 140 Jy

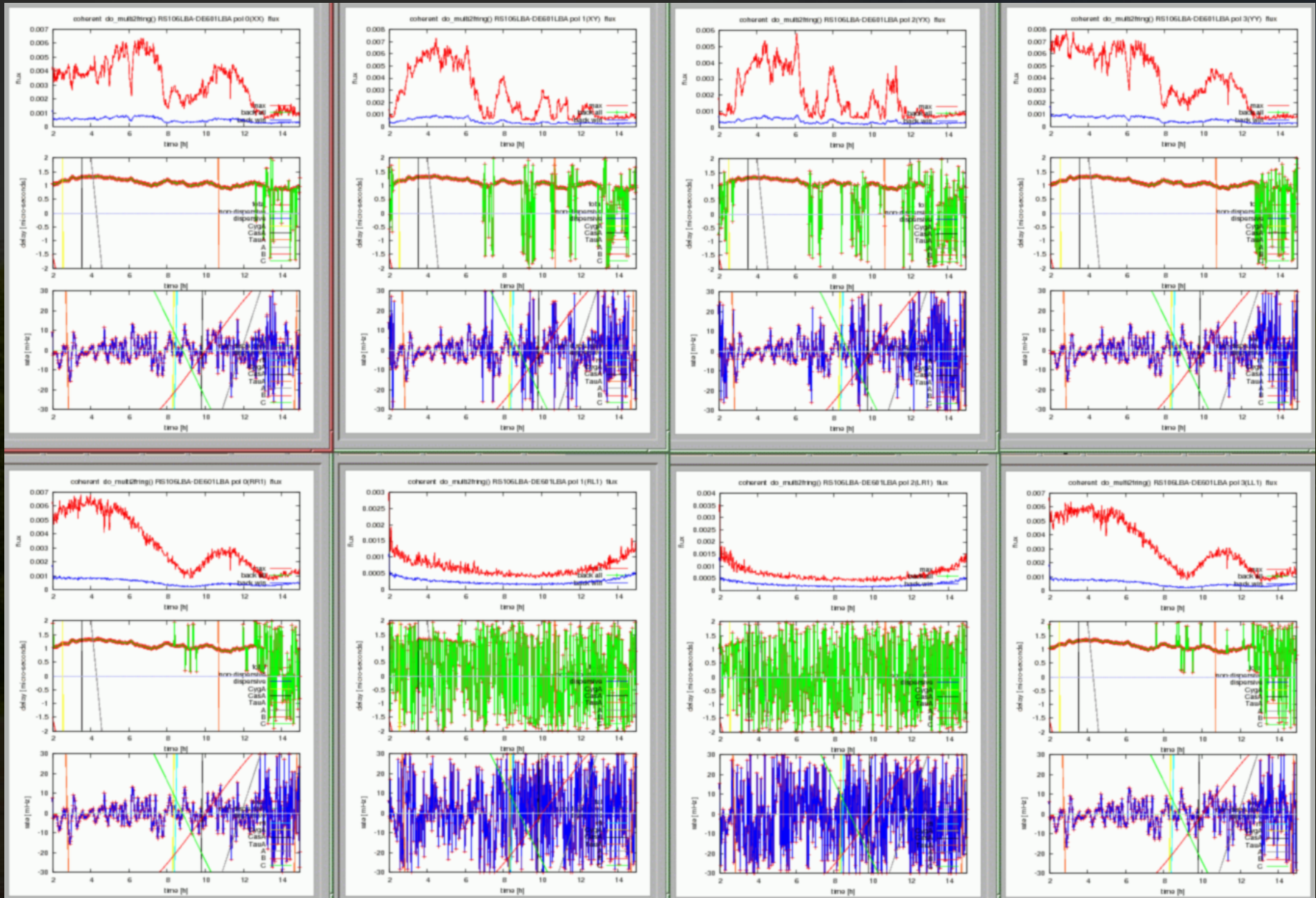
Short-baseline map: some details

- 3C196 with LBA, 80 subbands, 36–67 MHz
- bandwidth 15.6 MHz / 23 MHz
- L2009_14319 12.5 h on 12 Sep 2009, no ripple
- only used 4 Dutch stations: RS106, RS208, RS307, RS503
- RR and LL from XX/XY/YX/YY using geometric model
- (self-)calibrated and imaged RR+LL in AIPS
- MFS without spectral index correction
- no position-dependent gains, no full measurement equation
- noise ~ 20 mJy, dynamic range ~ 7500 close to thermal

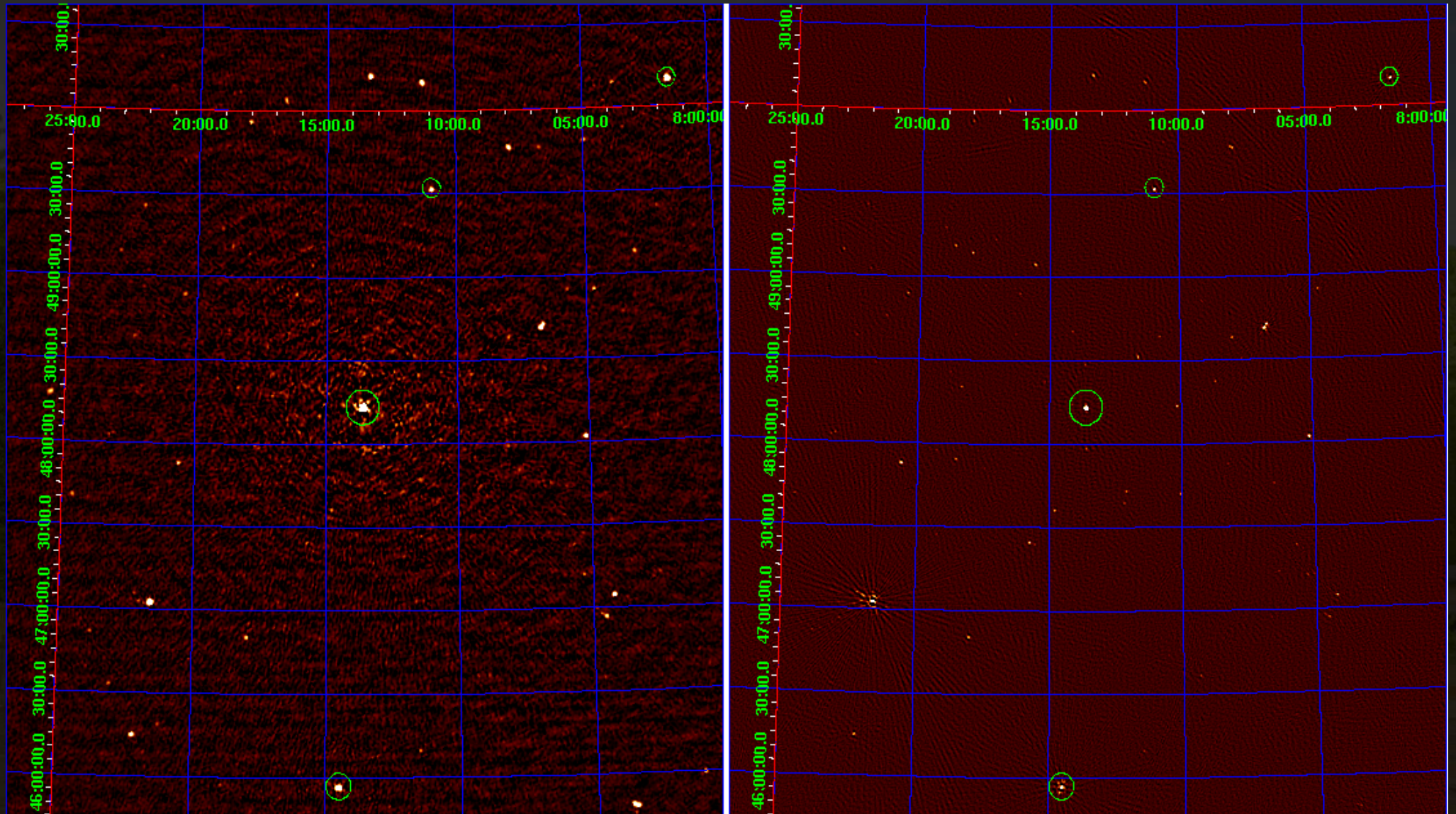
UV coverage: four stations, 36–67 MHz



Converting XX/XY/YX/YY to RR/RL/LR/LL



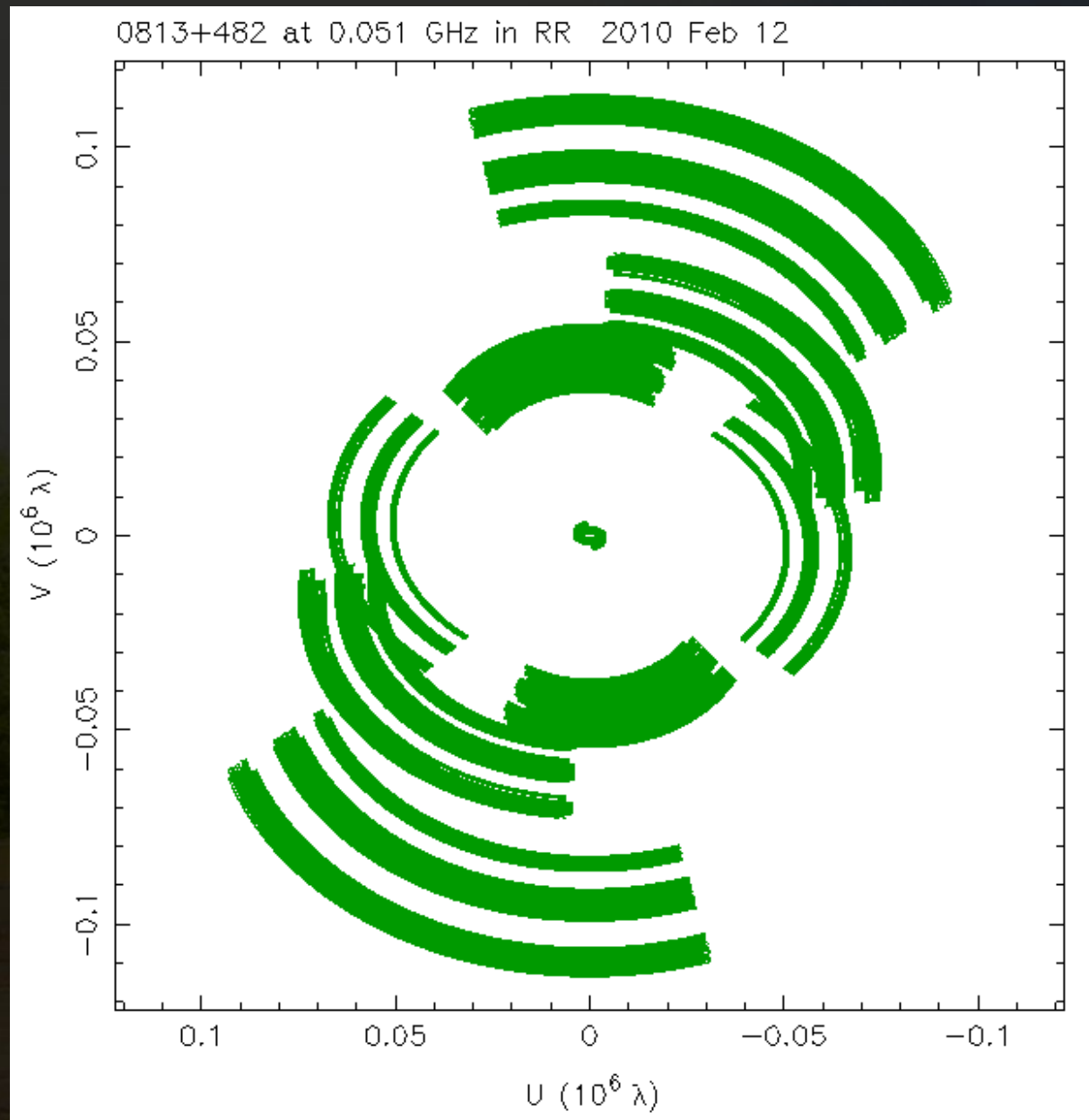
VLSS vs. LOFAR map of field around 3C196



long-baseline map: some details

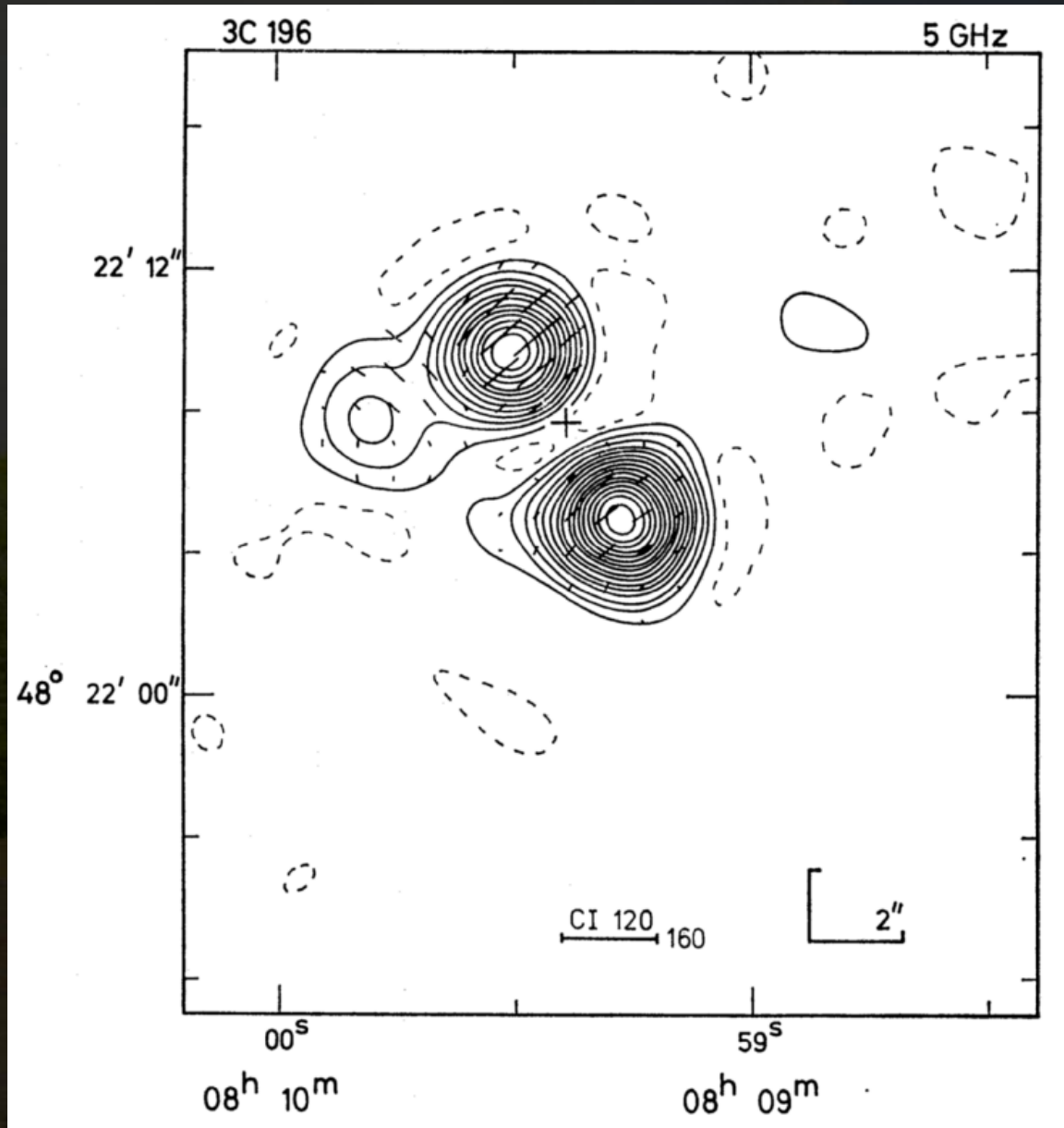
- 3C196 with LBA, 31 subbands, 44–59 MHz (ripple!)
- bandwidth 6 MHz / 48 MHz
- D2010_16704 6 h on 12/13 Feb 2010
- 5 NL + 3 DE stations (Effelsberg, Unterweilenbach, Tautenburg)
- corrected for 1 μ sec and 17 μ sec constant delays
- RR and LL from XX/XY/YX/YY using geometric model
- (self-)calibrated and imaged RR in difmap
- MFS without spectral index correction

UV coverage long and short baselines



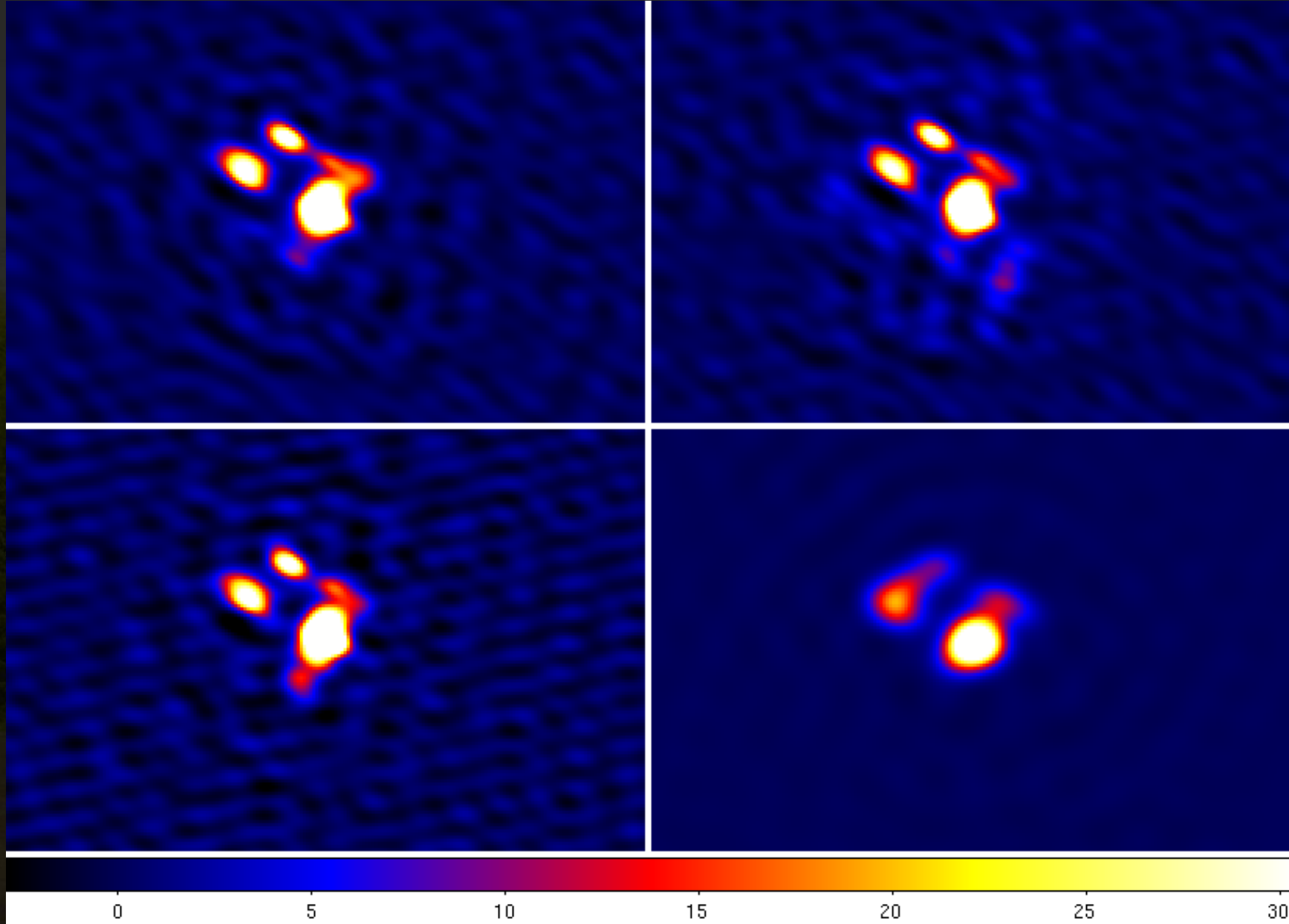
3C196 on long baselines: expectations

Cambridge 5km at 5 GHz



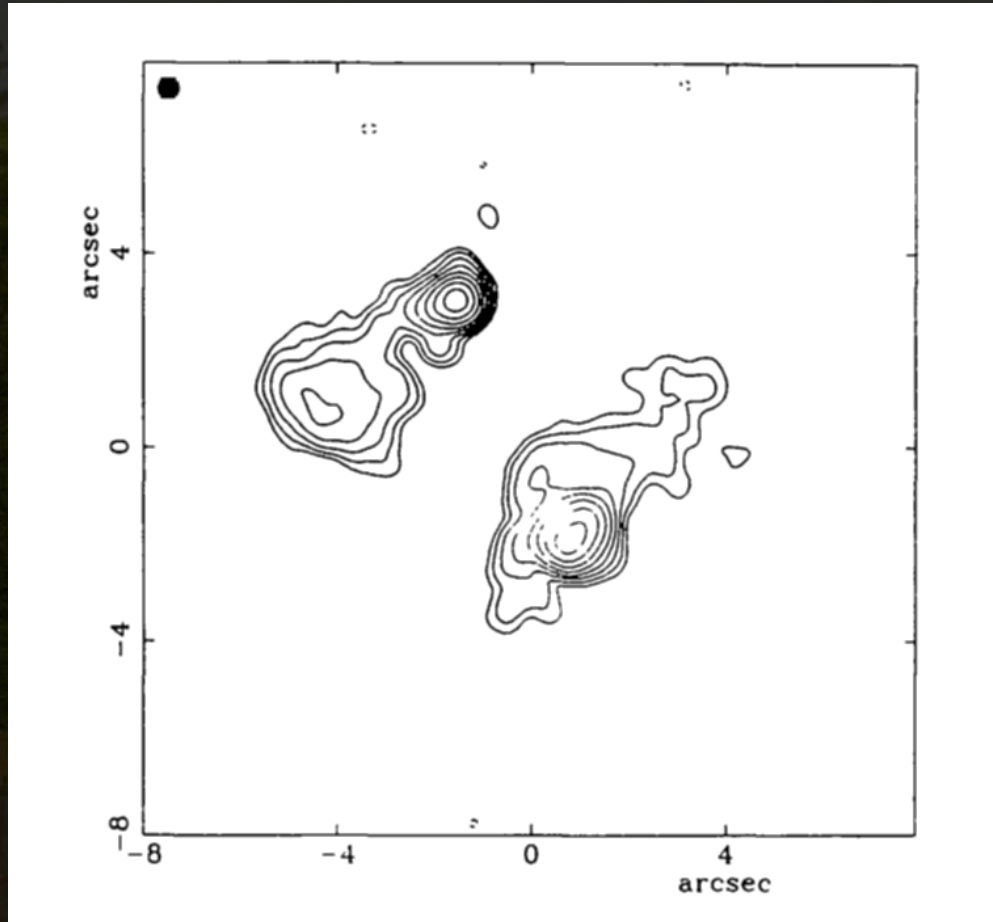
[Pooley & Henbest (1974)]

First long baseline maps of 3C196



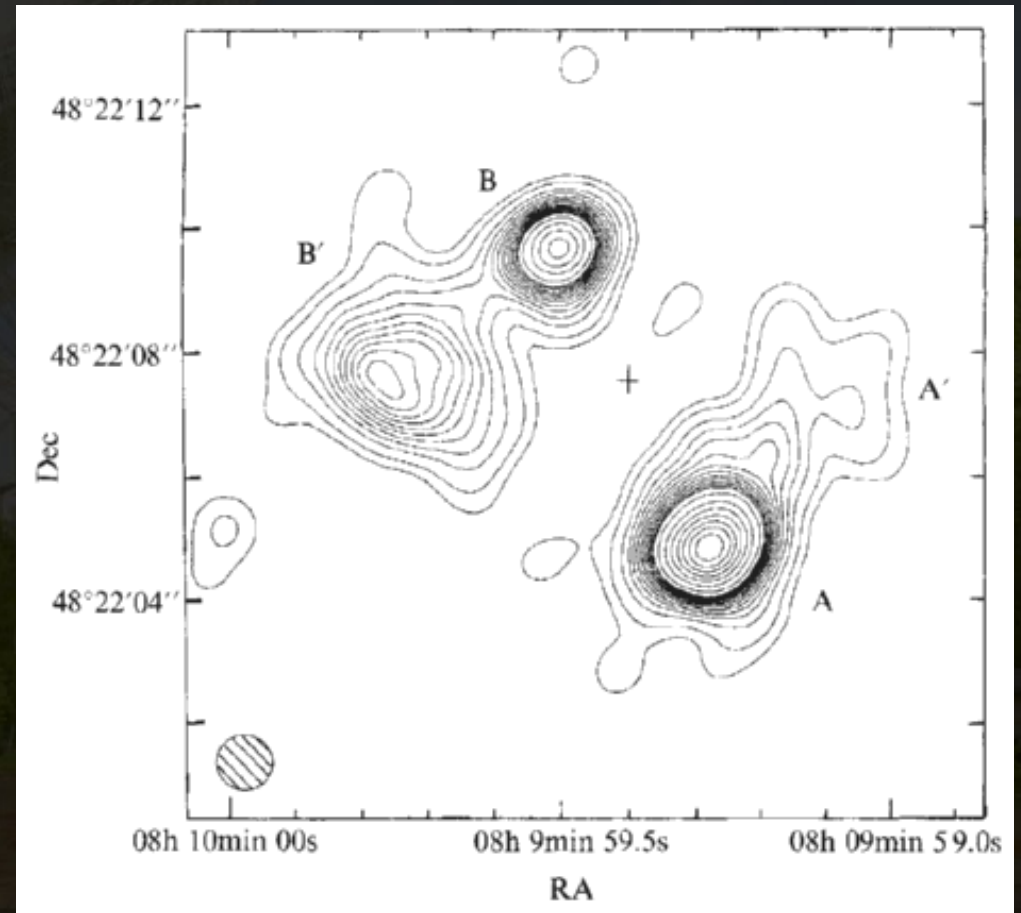
MERLIN / MTRLI maps

1666 MHz



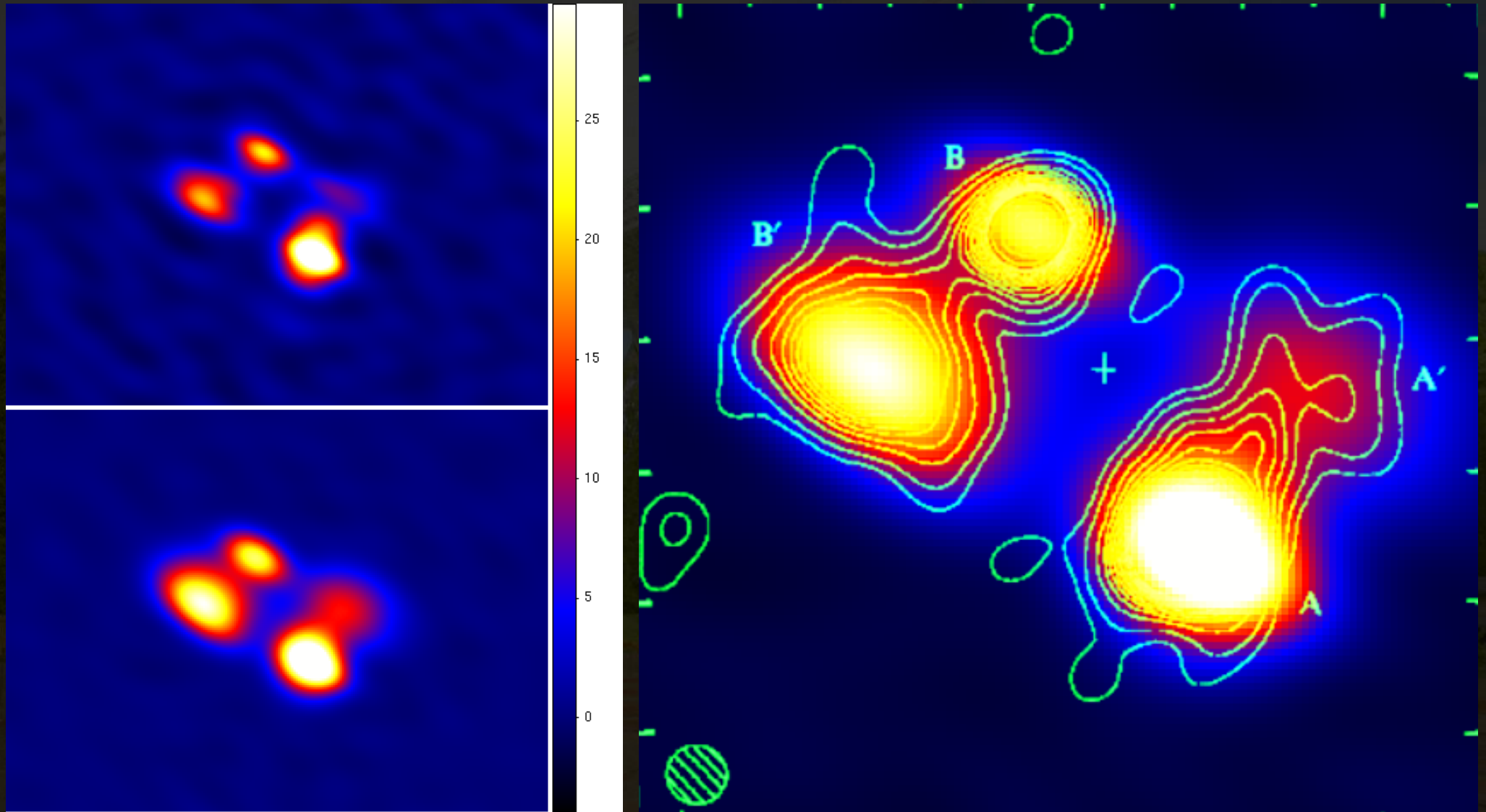
[Reid et al. (1995)]

408 MHz



[Lonsdale & Morison (1980)]

Additional maps, overlay with 408 MHz



Conclusions

- imaging on long baselines is possible !
- not yet with the pipeline
- to do
 - ★ fix technical problems (ripple, polarisation labels, clock offsets)
 - ★ station calibration (proper beam forming)
 - ★ implement fringe-fitting in pipeline
 - ★ differential Faraday rotation
 - ★ dipole response (63 MHz resonance?, < 30 MHz?)
- more stations to come, busy times ahead of us!

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