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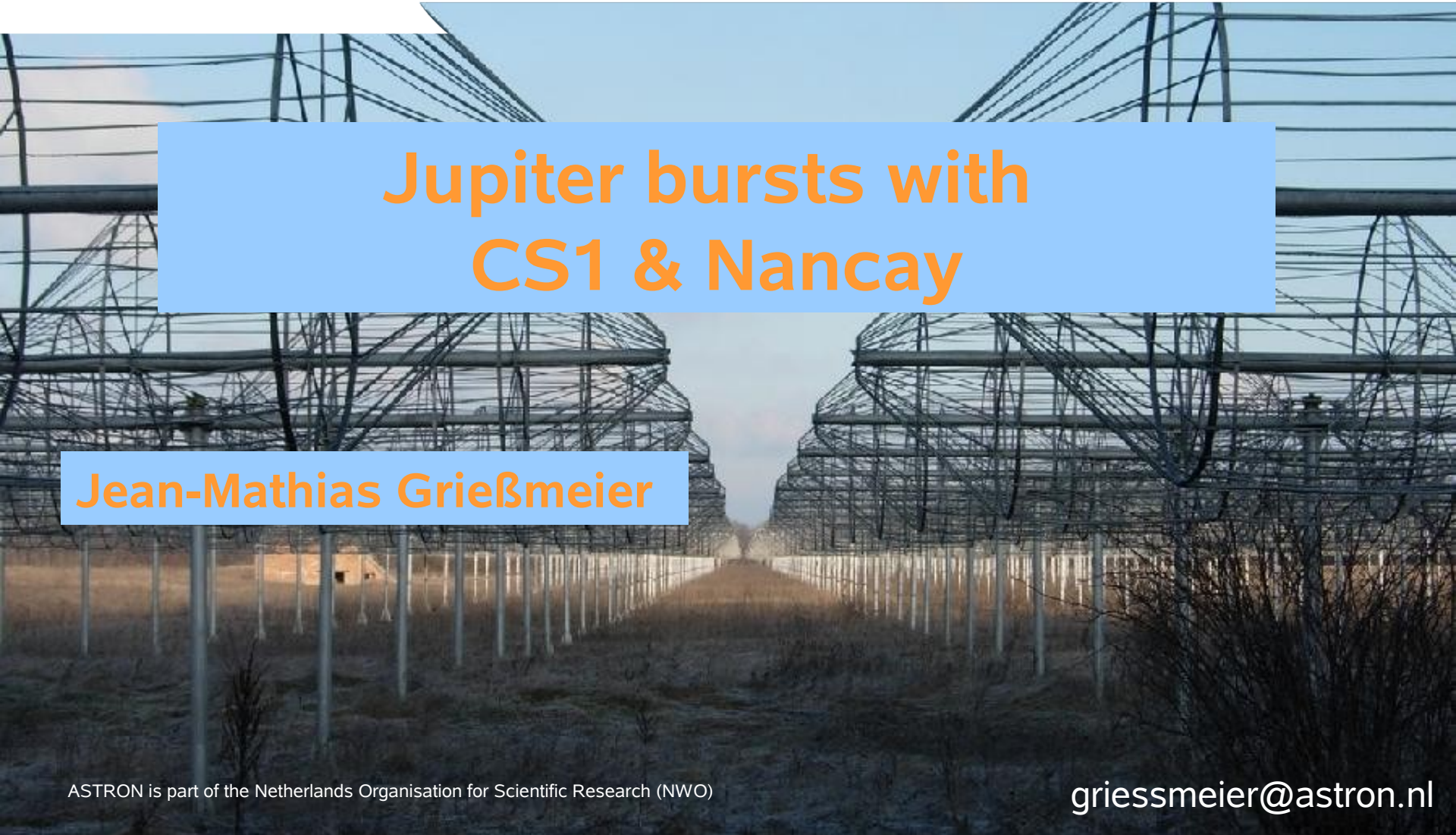

Jupiter bursts with CS1 & Nancay

Jean-Mathias Grießmeier

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The team

ASTRON

- Philippe Zarka
- Casey Law
- Laurent Denis
- Cedric Dumez-Viou
- Michiel Brentjens
- James Anderson
- Joseph Masters
- Kalpana Singh
- Nicolas Pradel

Jupiter's radio emission

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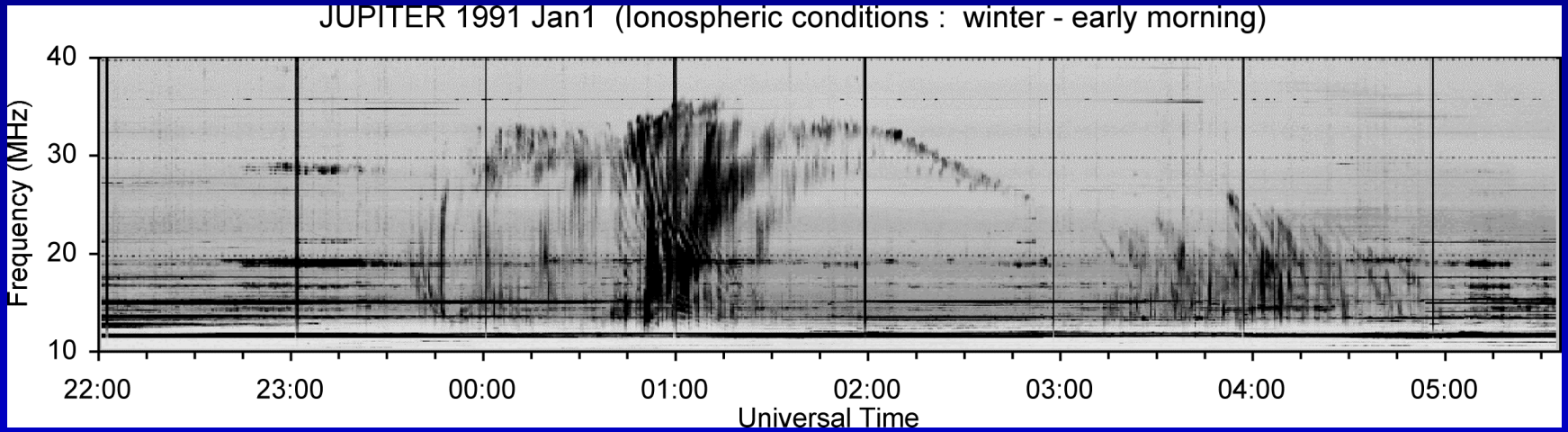
Decametric radio emission of Jupiter



- series of intense radio bursts
- f < 40 MHz
- cyclotron maser emission
- generated in planetary magnetosphere

$$f_c \propto \frac{eB}{m_e}$$

Simultaneous observation 10/04/2008

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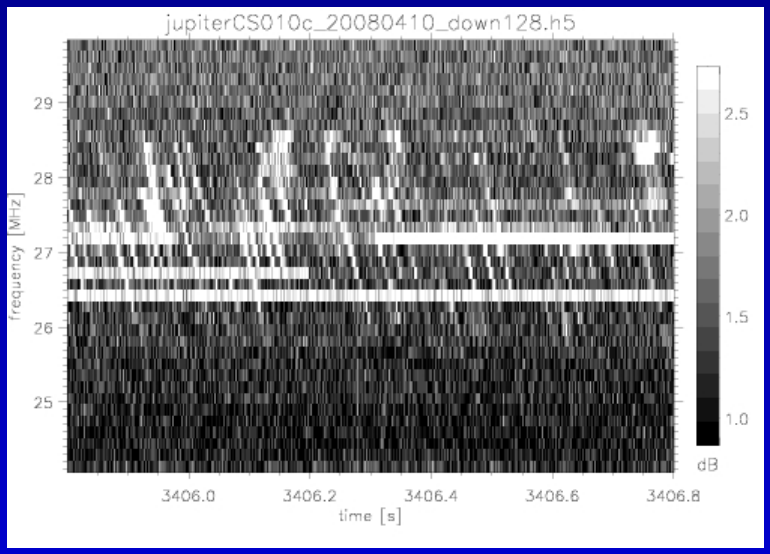

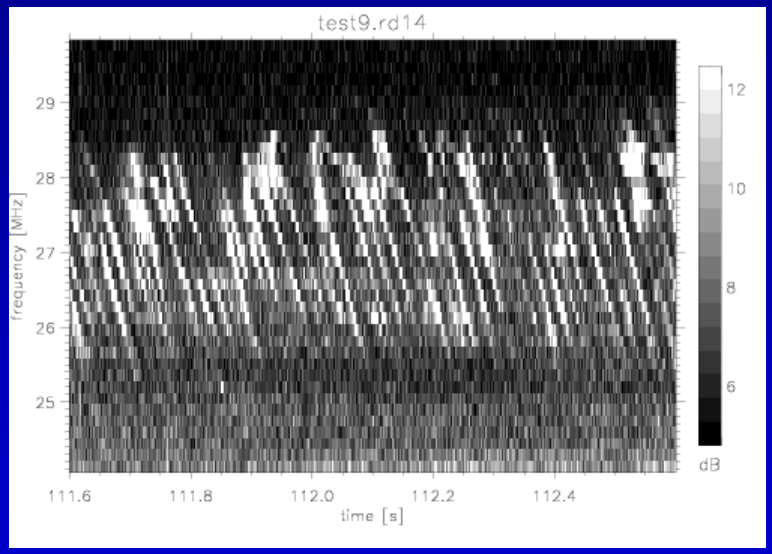

Δt=0.8 msec
(of 6.4 μsec)

Δf=156 kHz

Simultaneous observation 10/04/2008

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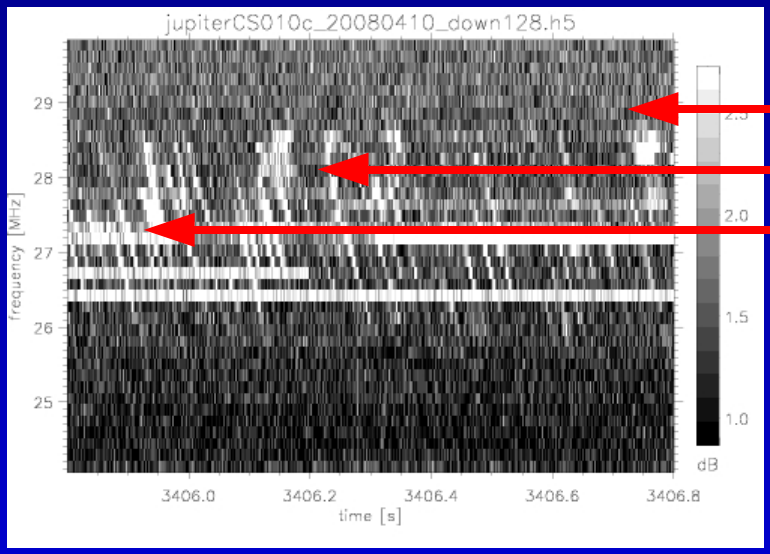

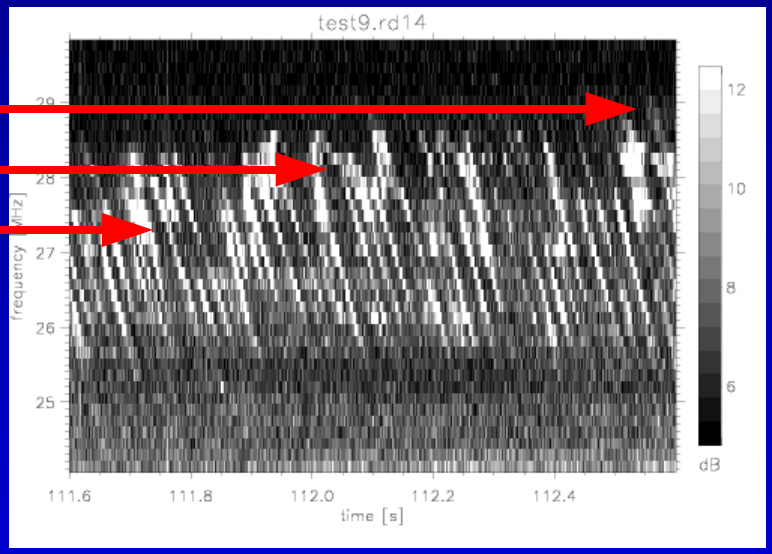

Δt=0.8 msec
(of 6.4 μsec)

Δf=156 kHz

Simultaneous observation 10/04/2008

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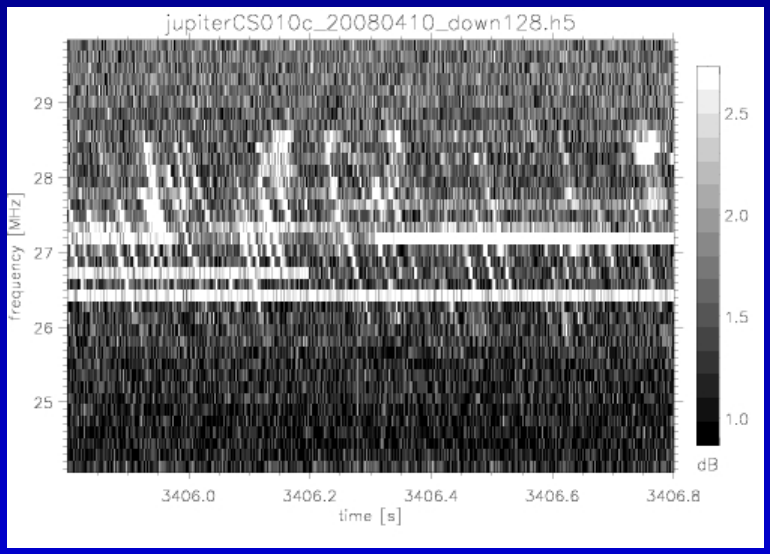
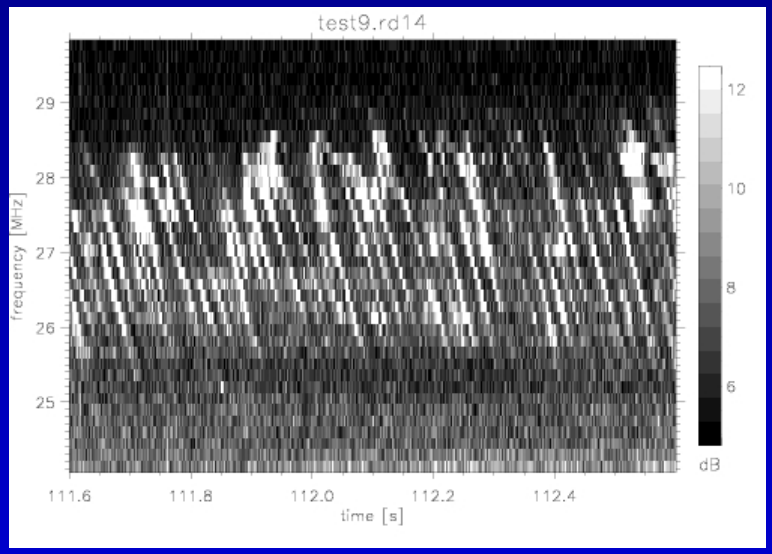
LOFAR (CS10)



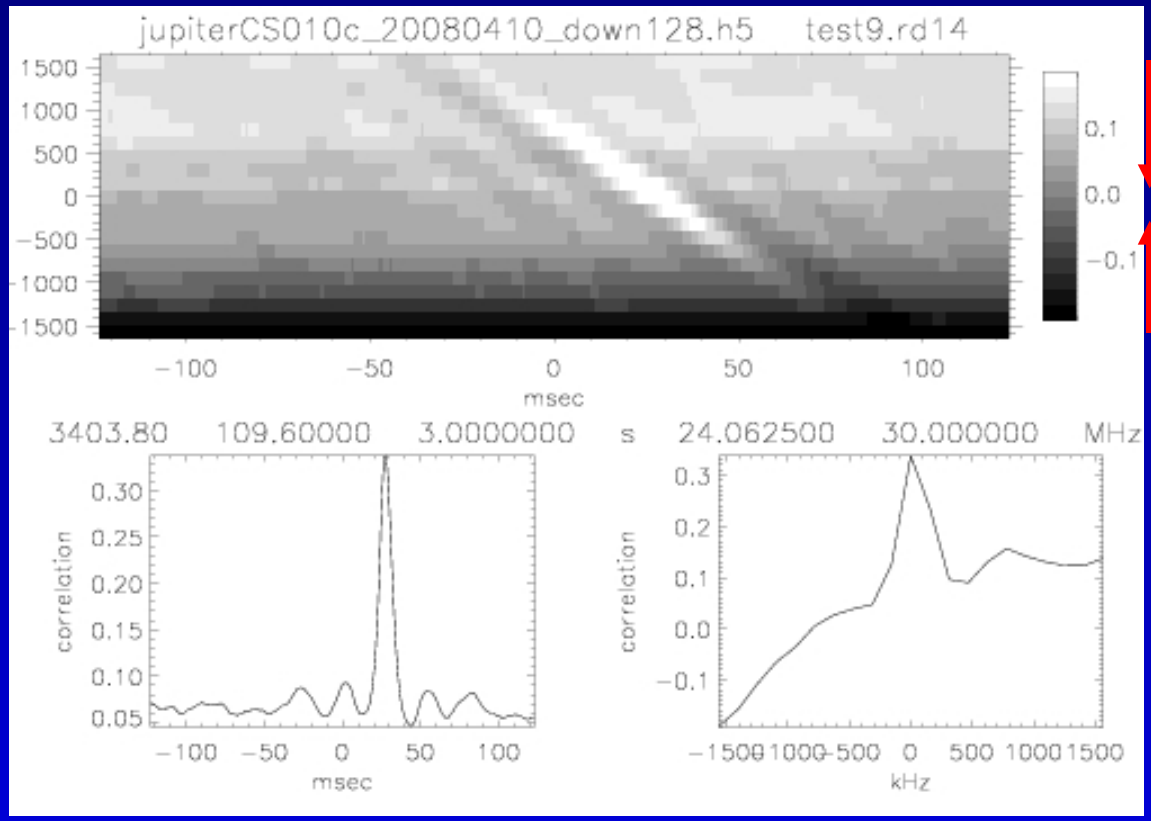
Nancay (NDA)



Δt=0.8 msec
(of 6.4 μsec)

Δf=156 kHz

Correlation



gradient in correlation!

- best correlation: 36%
- Δt=23.8 msec (no absolute timing!)
- Δf=156 kHz

Average spectra

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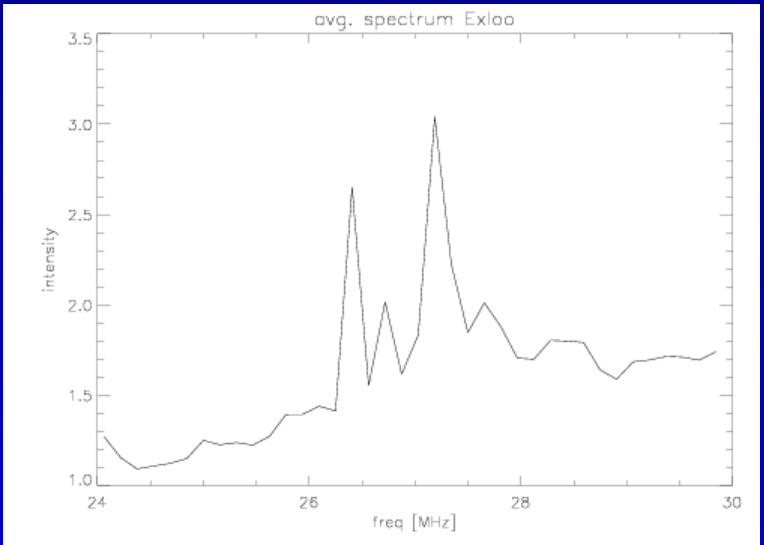
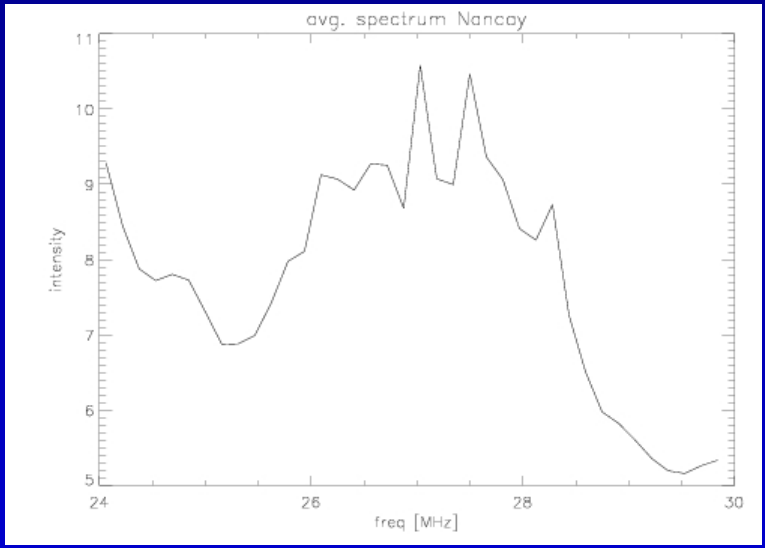
LOFAR (CS10)



Nancay (NDA)



Correlation

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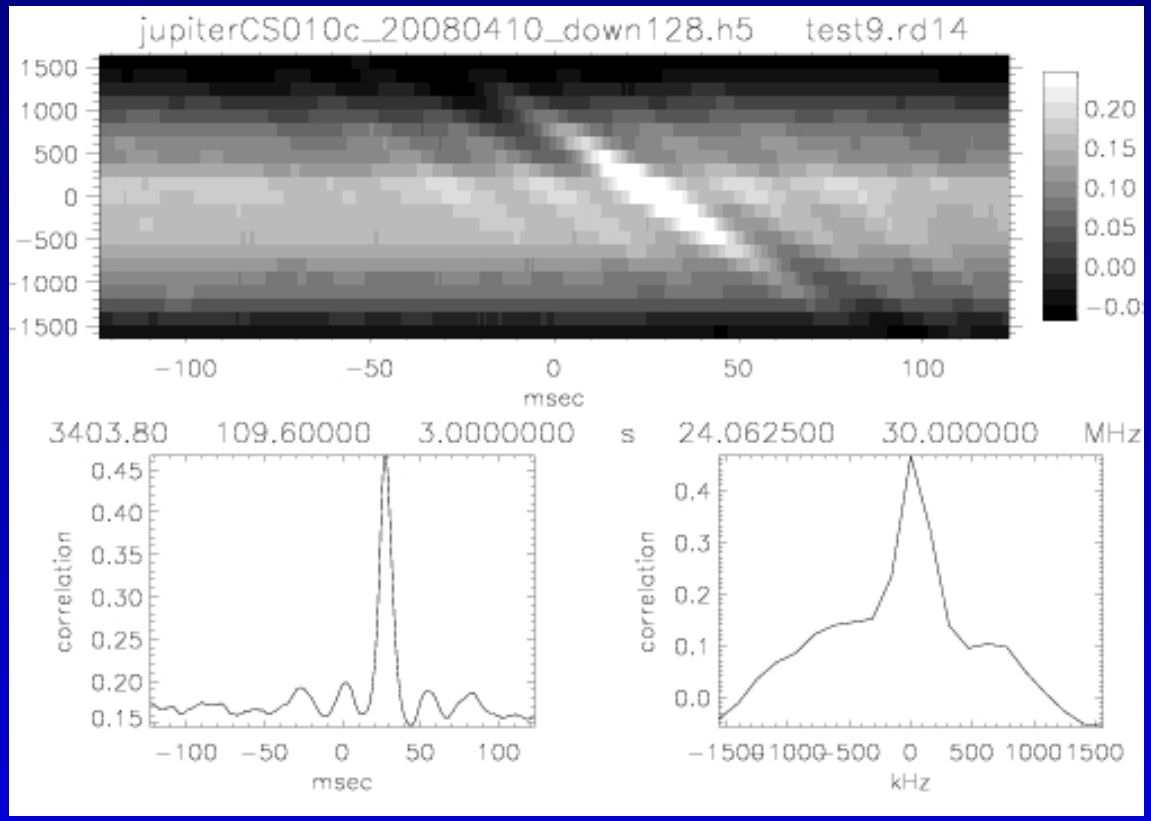

- best correlation: 47%
- Δt=27.9 msec (no absolute timing!)
- Δf=0 kHz

Time delay

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- is the time delay constant?
- a clock drift was seen for ITS!

Time delay

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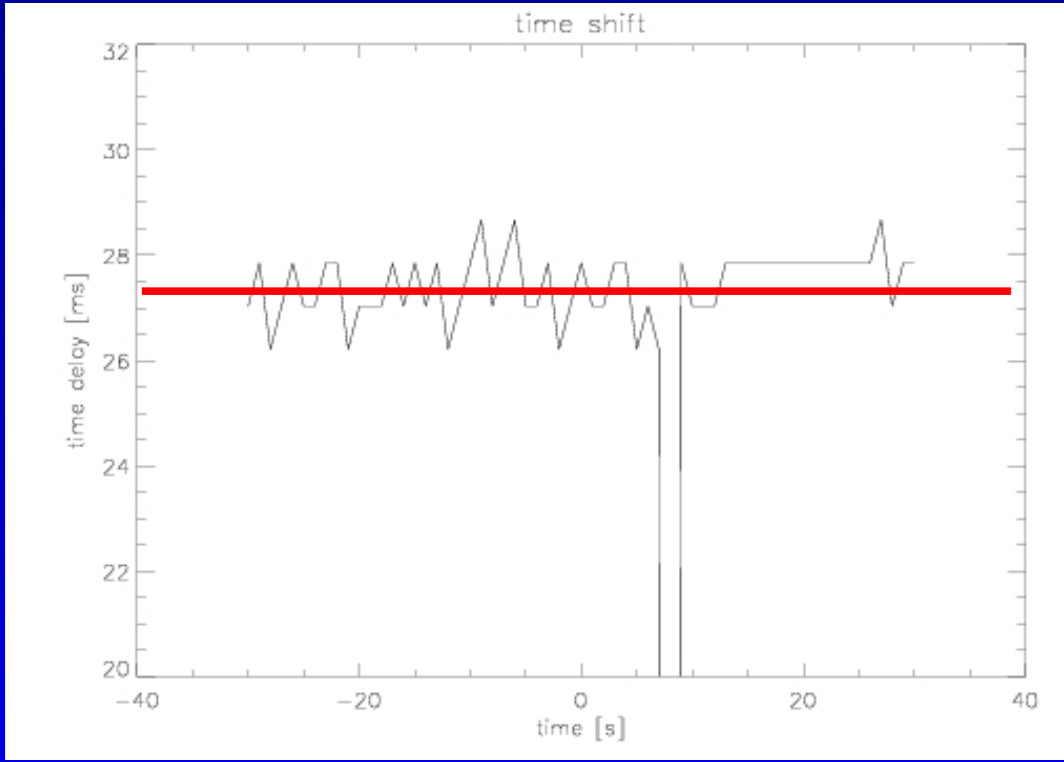
- is the time delay constant?
- a clock drift was seen for ITS!



⟹ time resolution not sufficient!

Next steps

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- repeat with improved time resolution (128 times better) – planned week!
- check for relative clock drift
- check correlation for both polarisations?
- repeat with polyphase-filtered Nancay-data (Kalpana Singh)
- correlate Exloo-Effelsberg (Nicolas Pradel)
- … your ideas!

Thanks!

Jupiter's radio emission

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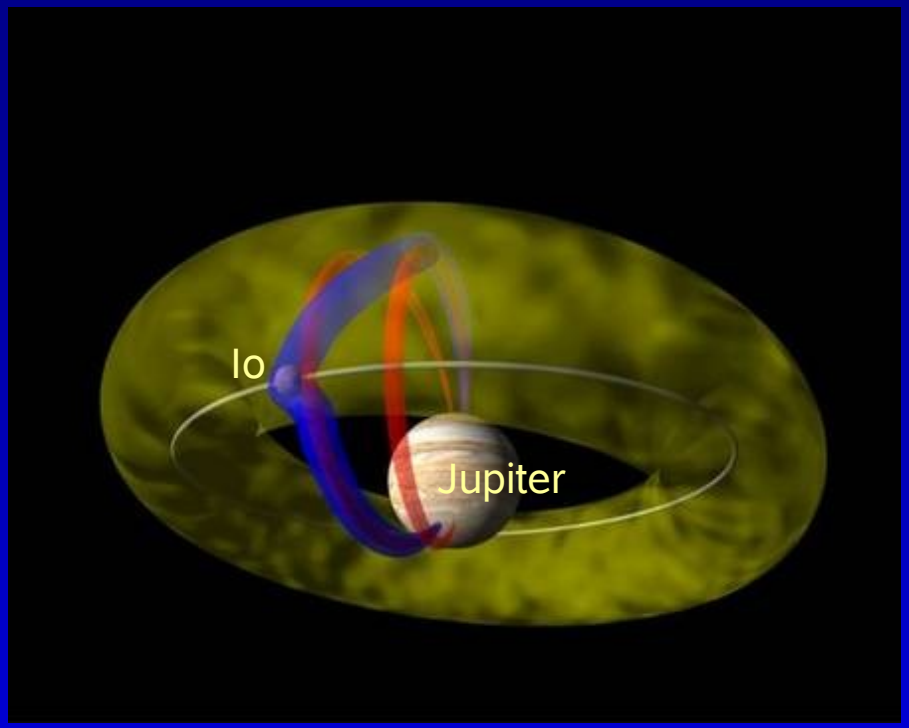
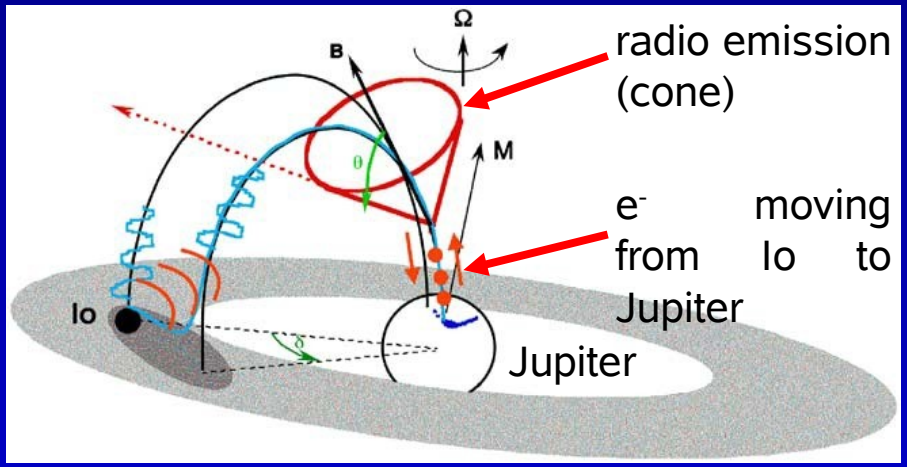
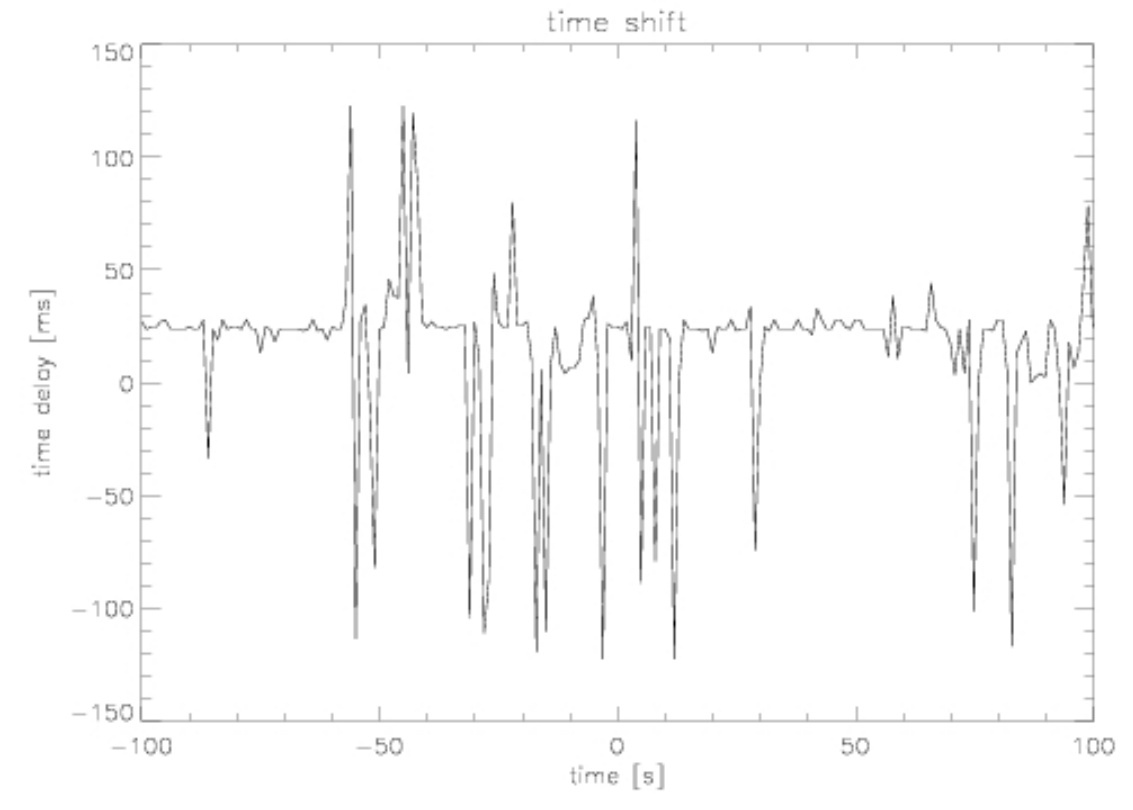
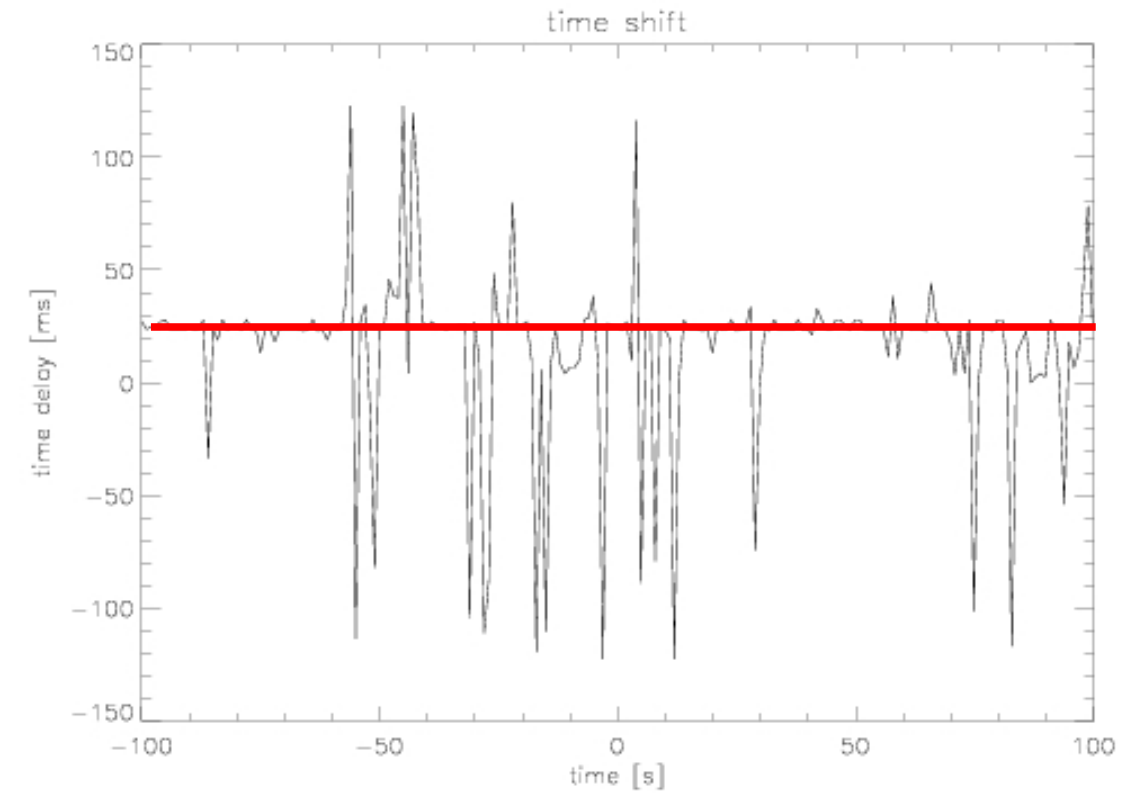
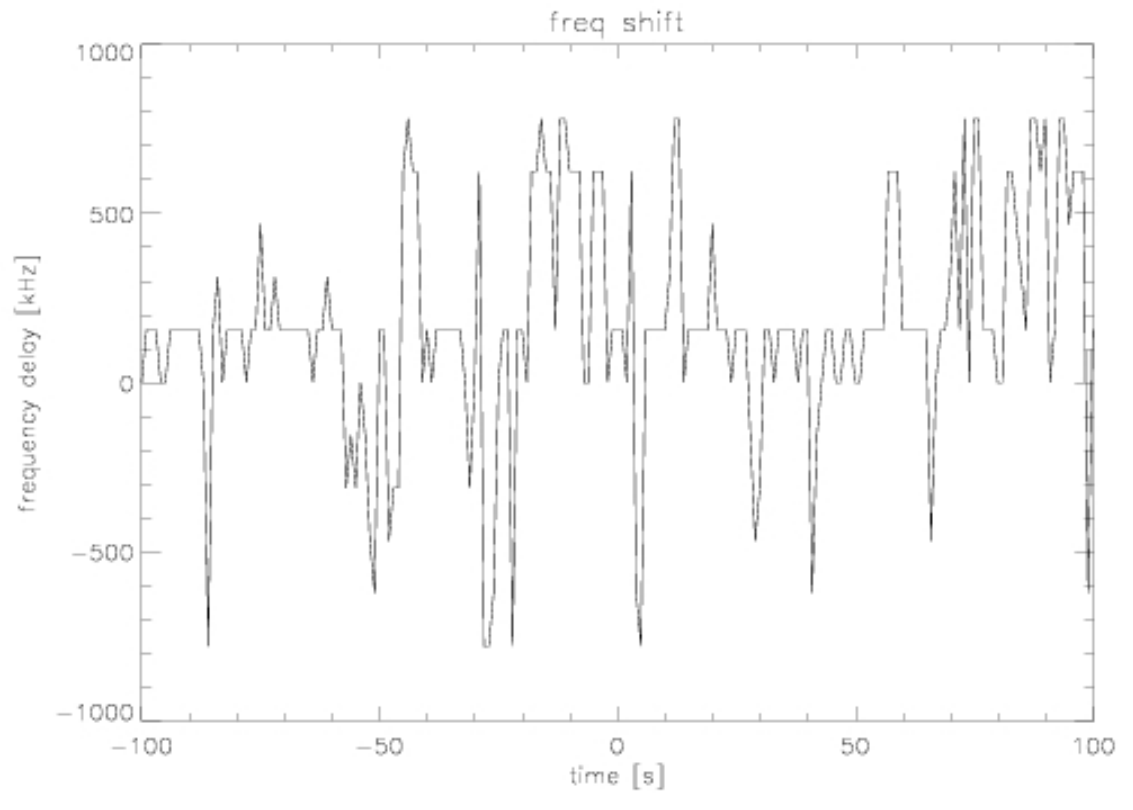
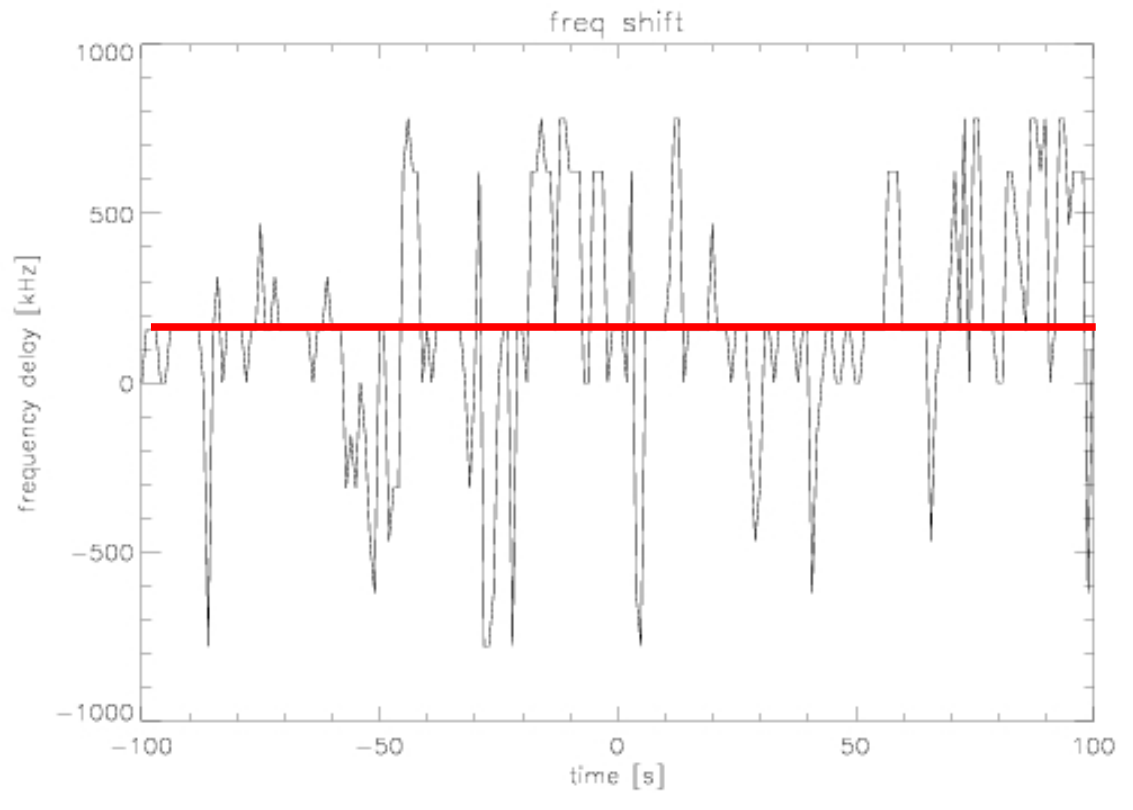





time shift
time delay [ms]
150
100
50
0
−50
−100
−150
−100
−50
0
50
100
time [s]


time shift
time delay [ms]
150
100
50
0
−50
−100
−150
−100
−50
0
50
100
time [s]


freq shift
1000
500
0
−500
−1000
frequency delay [kHz]
−100
−50
0
50
100
time [s]


freq shift
1000
500
0
−500
−1000
frequency delay [kHz]
−100
−50
0
50
100
time [s]