Amas@Nançay

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LAL-Orsay
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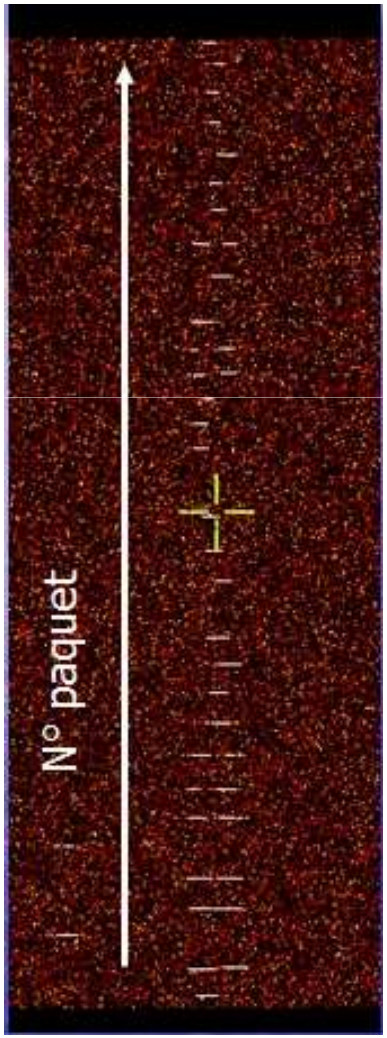
Data acquisition

- 2 polarisations from the focal plane of the Radiotelescope at Nançay, equipped with the BAO-Radio electronics [1250-1500] MHz
- 1st tests in July 2010: UGC4358 & 3C227/3C286
- Observation time: >60h Q1&2 of 2011 on Abell1205, Abell2240, Abell85. System tests: Jan-Mar 2011. Fully operational since April 2011.
- Data Transfer on Irods @ CCIN2P3: 75To HPSS
- Semi-automatic analysis ongoing: calibration, band cleaning, spectra ON-OFF.
- But: suppression of RFI, sensitivity, HI signal of Abell85 and if possible the other Amas…

Time-frequency analysis



Acquisition rate 8~10kHz

Bandwidth 250MHz

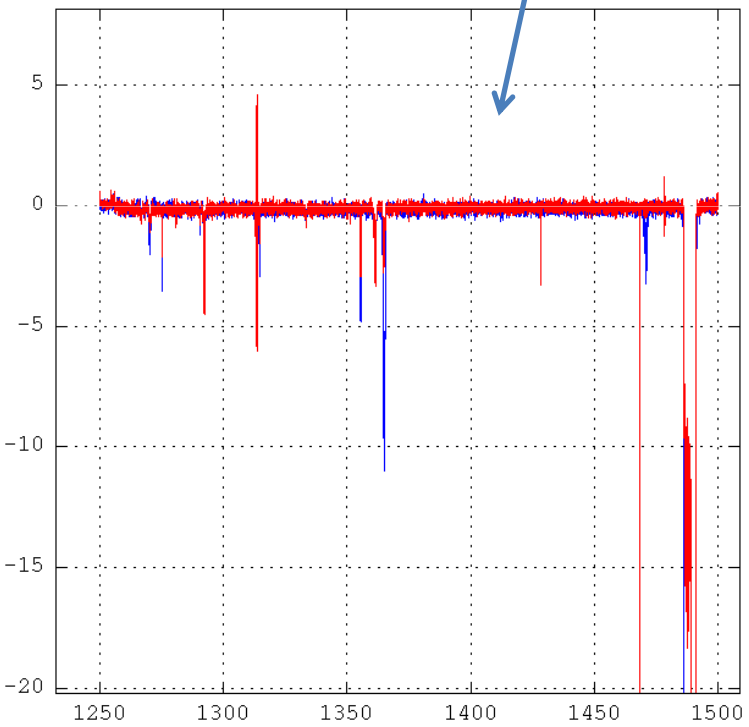
Binning ~30kHz (FFT on the fly)

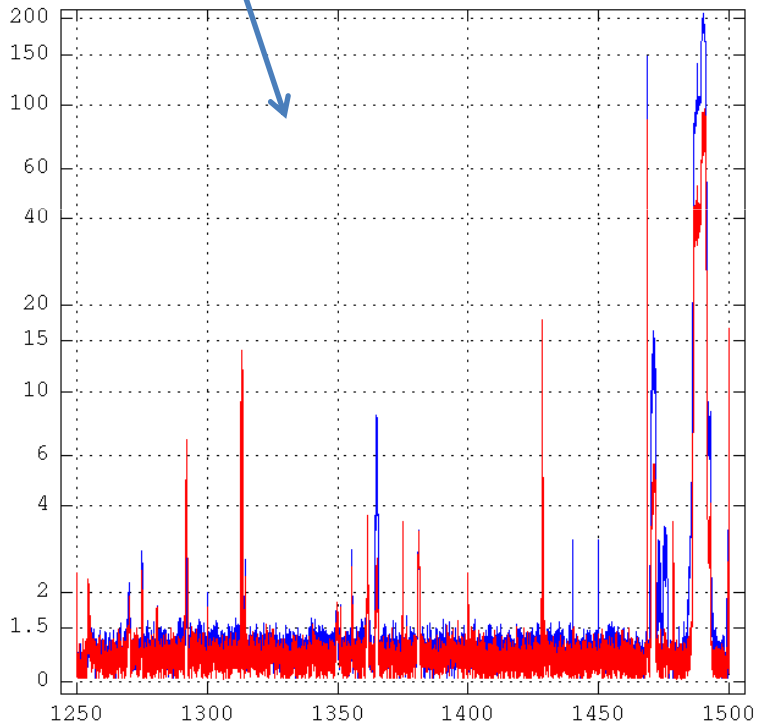
$$r_i = \frac{mean_i - \langle mean_i \rangle}{\sigma_i / \sqrt{N_{paq.per.win}}}$$

i: running over 100 sets of 25000 paq.
(small set just for demonstration)

Error on the mean

If NO RFI: Mean[r_i] = 0 and stdDev[r_i]=1





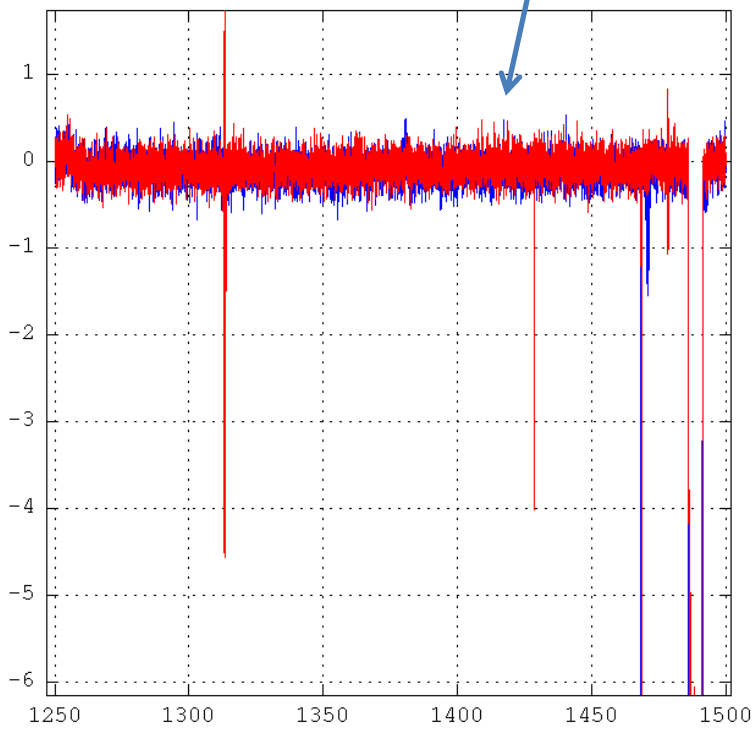
Ch 0 (1) : blue (Red)

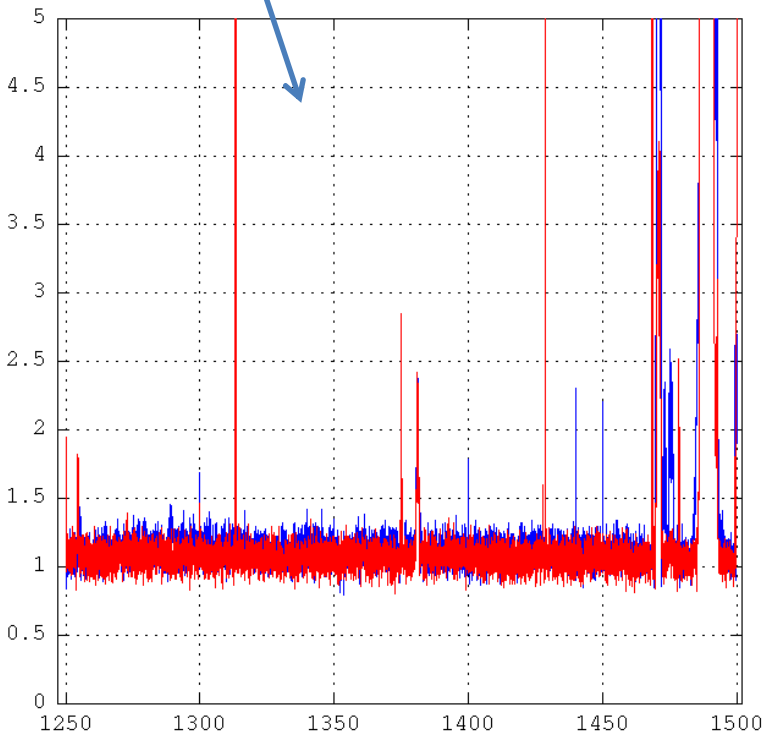
$$r_i = \frac{median_i - \langle median_i \rangle}{median_i / \left(\mathrm{Ln}\, 2 \times \sqrt{N_{paq.per.win}} \right)}$$

i: running over 100 sets of 25000 paq. (same data as previous slide)

Error on the median for an exponential law

If NO RFI: Mean[r_i] = 0 and stdDev[r_i]=1

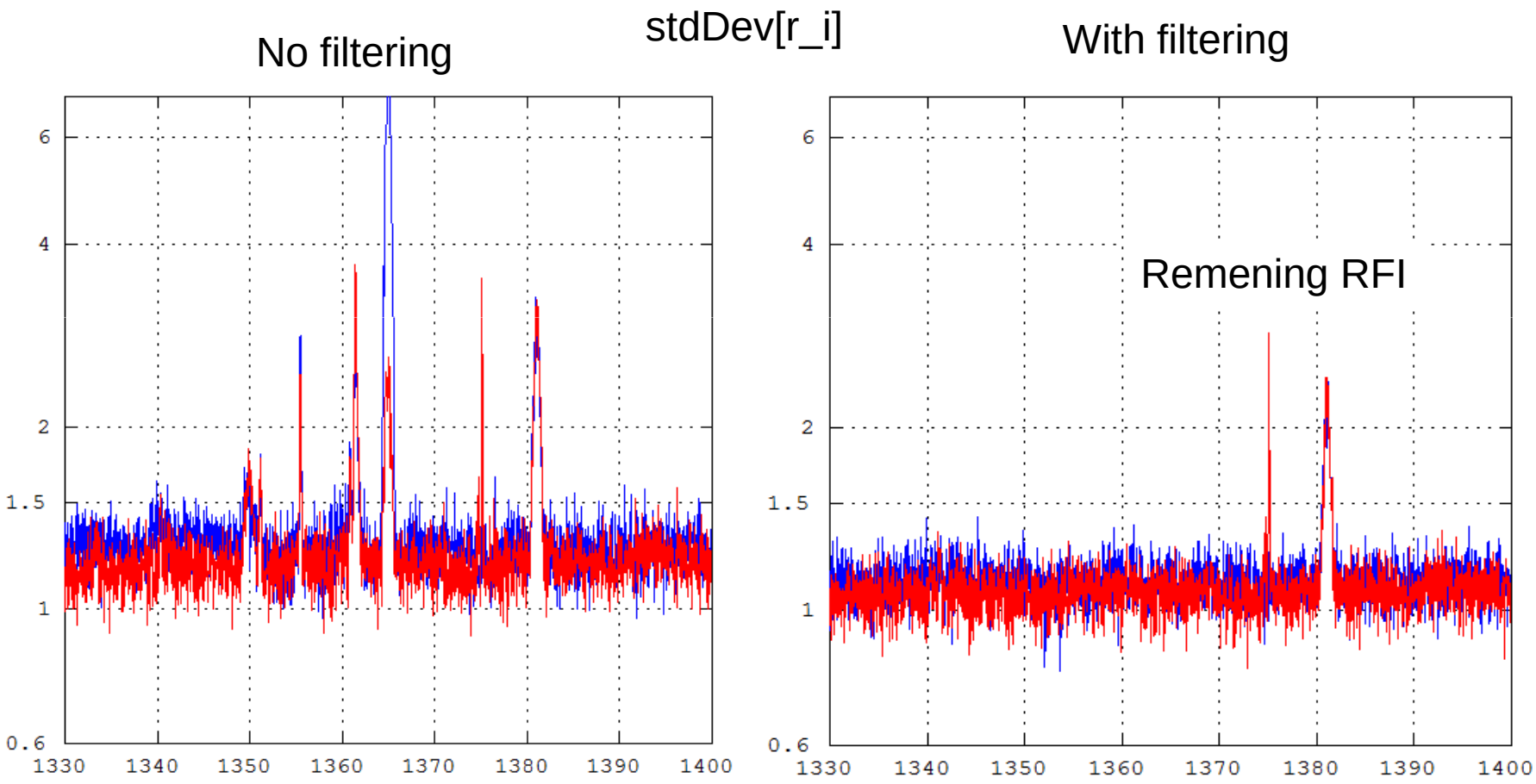




Ch 0 (1) : blue (Red)

Mind the Scale

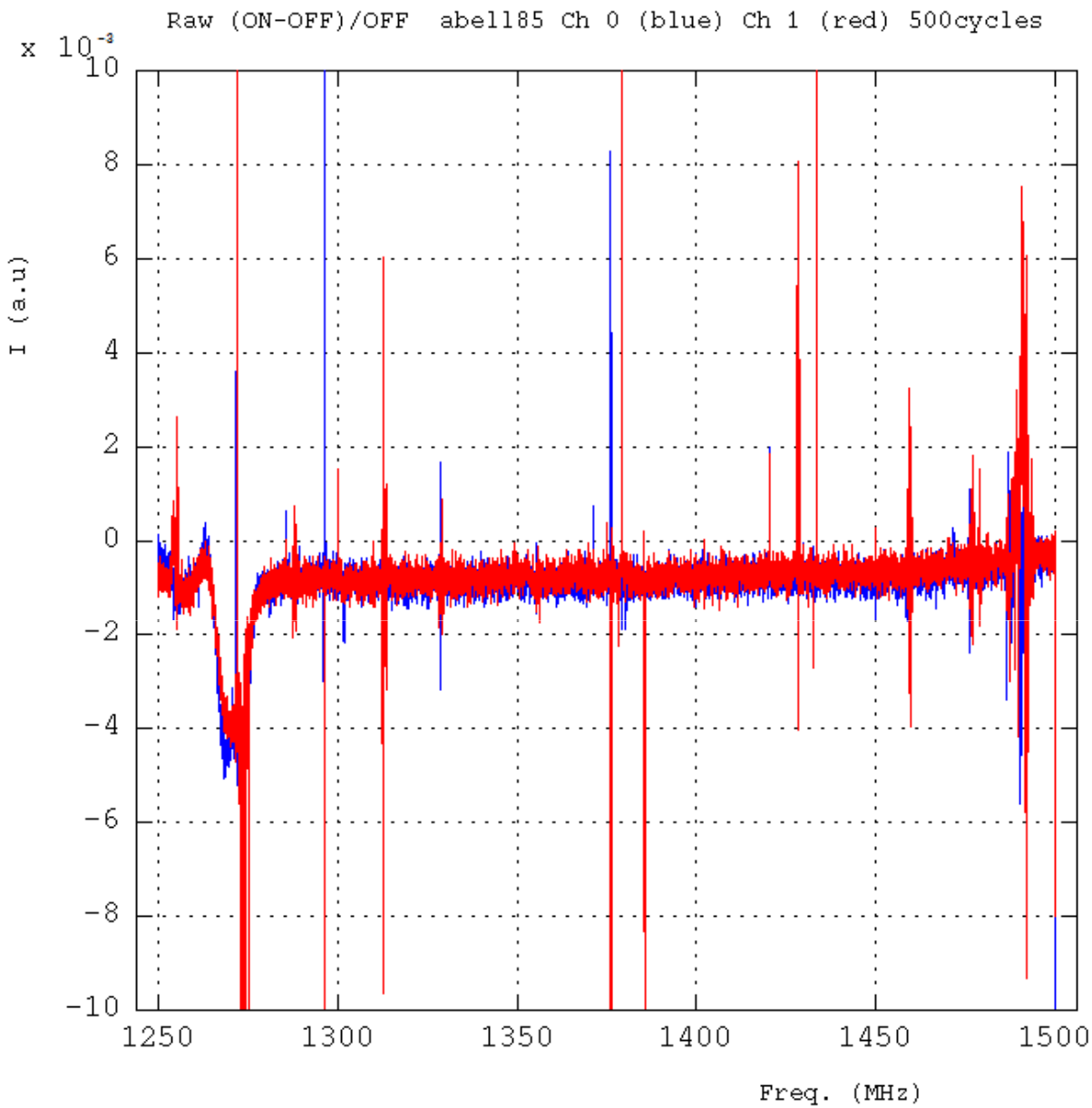
Comparison of the 2 methods



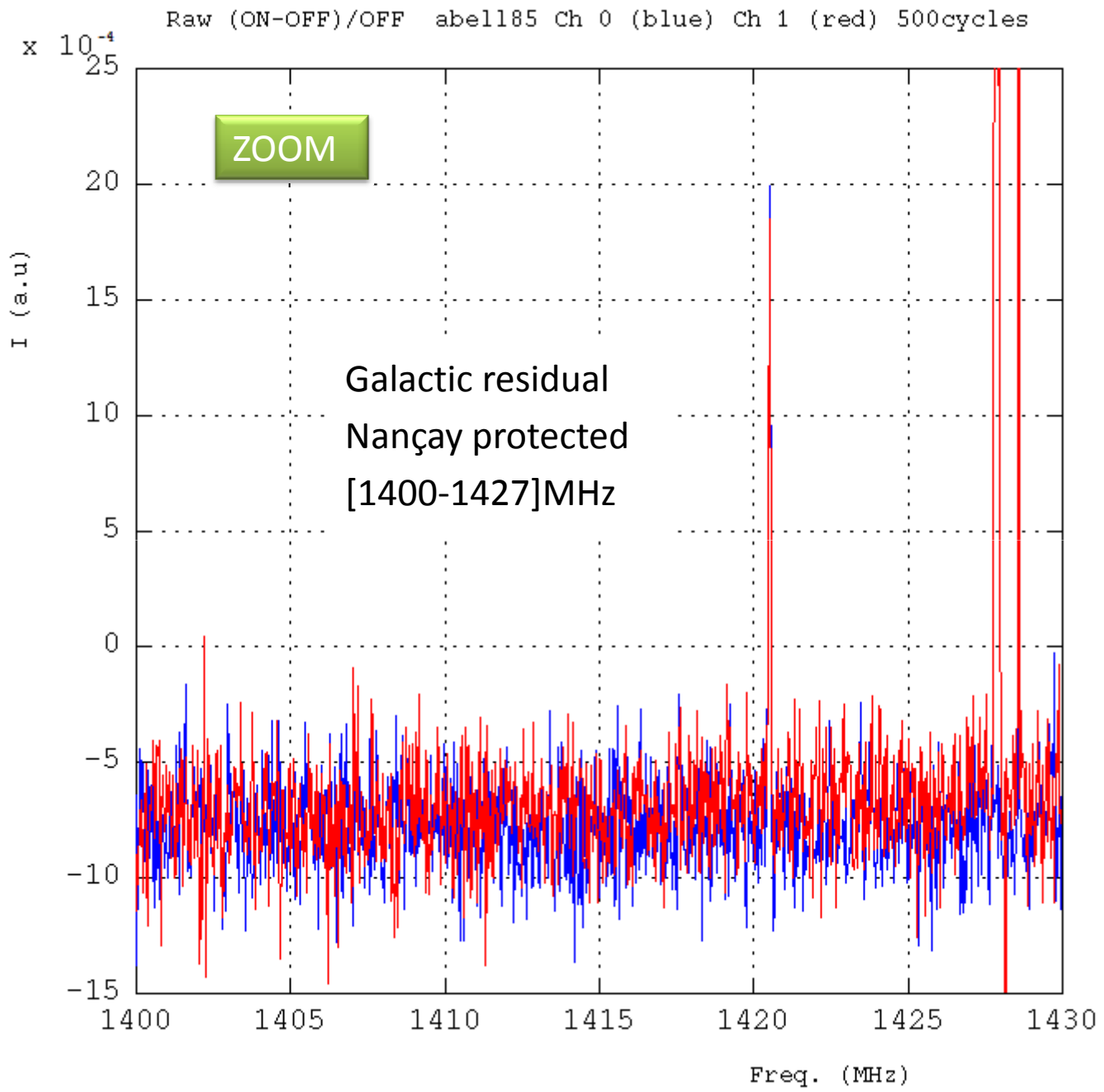
The cleaning seems to work…

500 x30sec x 1/3
= 5000sec on sky

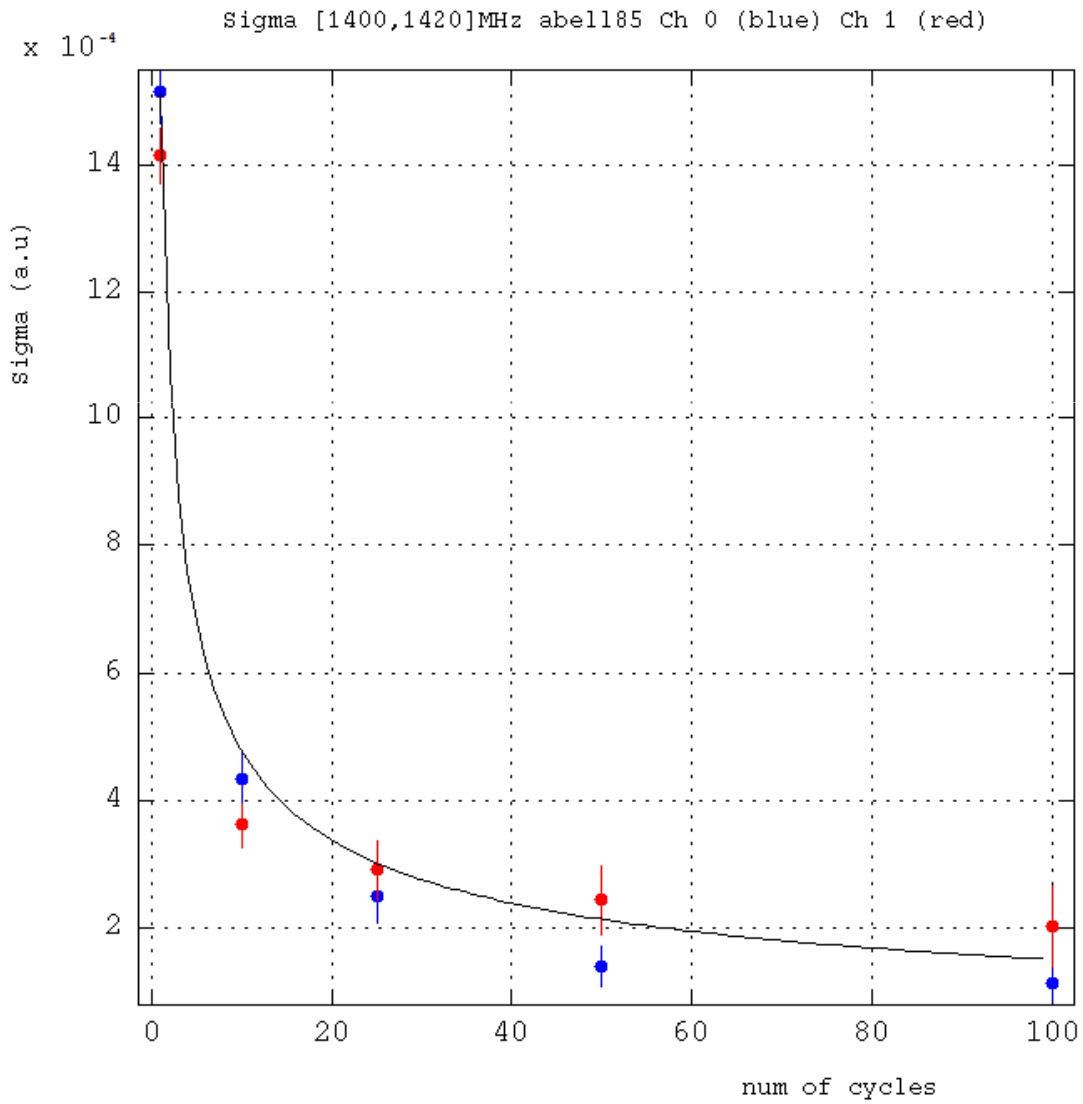
Only median filtering
over the paquets
(set of 25600 paq.)



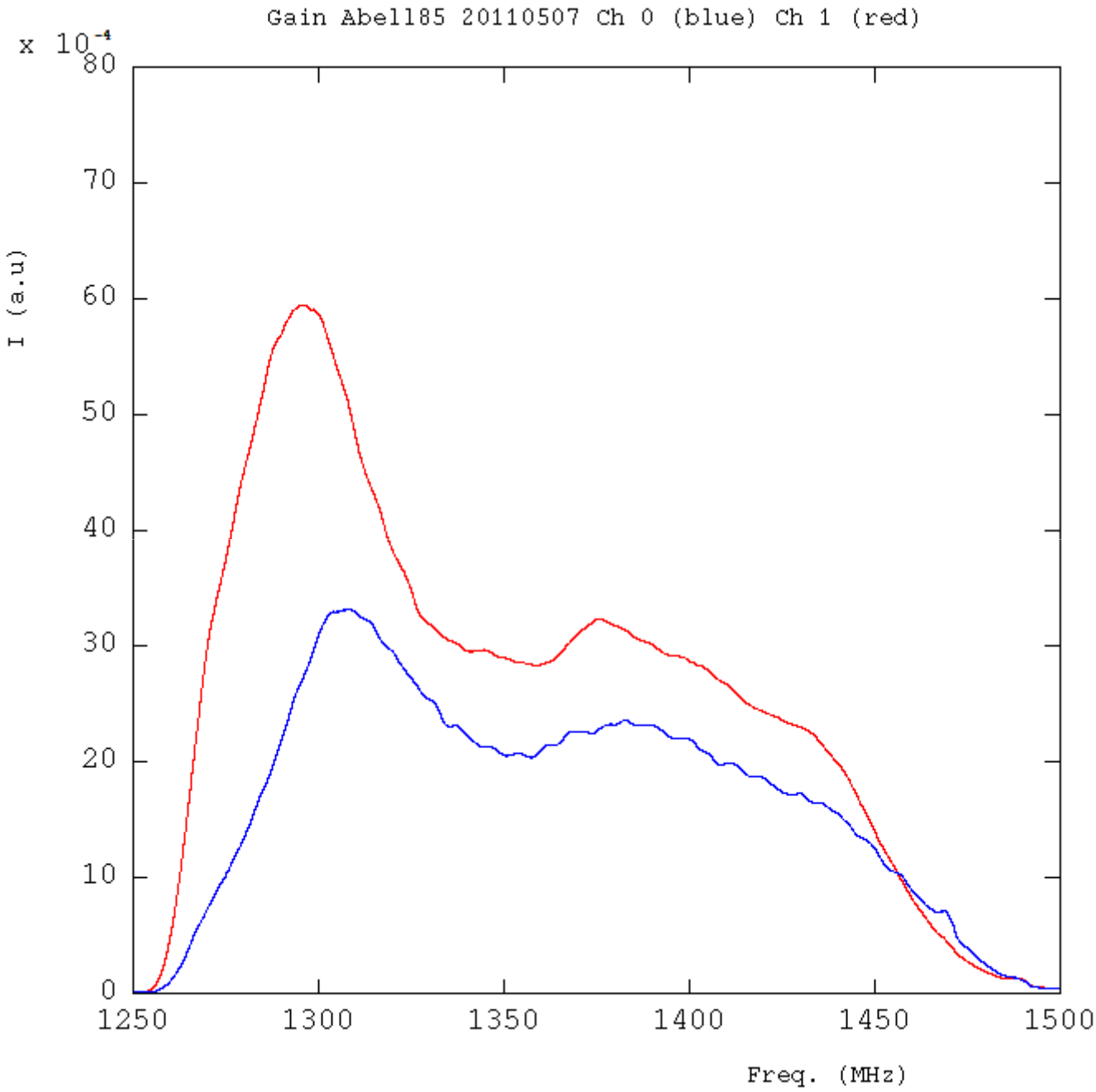
$$\left\langle \hat{S}(f) \right\rangle = \frac{1}{N_c^{Tot}} \sum_{r=1}^{N_r} \sum_{c=1}^{N_c(r)} \frac{(ON-OFF)_{r,c}(f)}{\widehat{OFF}_{r,c}(f)}$$


Raw (ON-OFF)/OFF abell85 Ch 0 (blue) Ch 1 (red) 500cycles
x 10^-4
I (a.u)
25
20
15
10
5
0
-5
-10
-15
1400
1405
1410
1415
1420
1425
1430
Freq. (MHz)
ZOOM
Galactic residual
Nançay protected
[1400-1427]MHz

Sigma evolution in the protected freq. zone after 100 cycles



Both channels follow the 1/sqrt(time) law.


Gain Abell85 20110507 Ch 0 (blue) Ch 1 (red)
x 10^-4
80
70
60
50
40
30
20
10
0
I (a.u)
1250
1300
1350
1400
1450
1500
Freq. (MHz)