PAON-4 data analysis

Data from Sep. 2016

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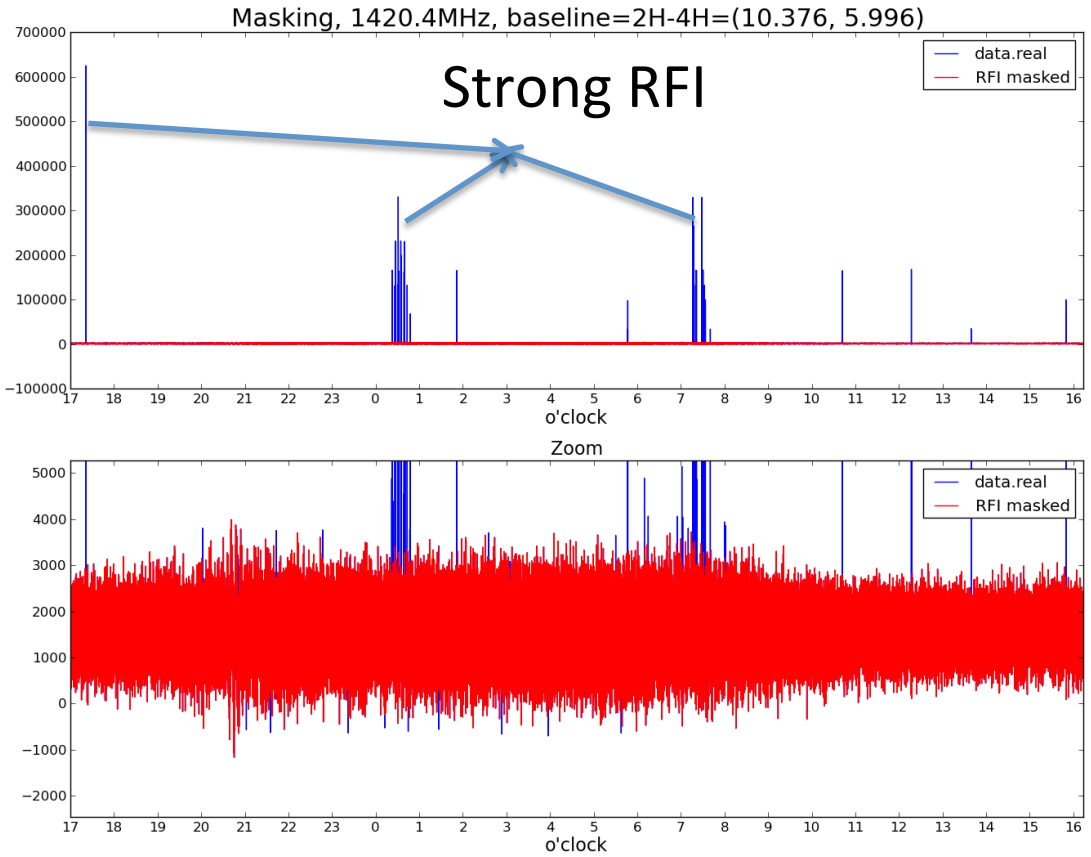
16 Nov. 2016

Masking/Flagging RFI

Masking/Falgging the strong RFIs is necessary before doing any analysis



I mask the RFI using the iteration method:

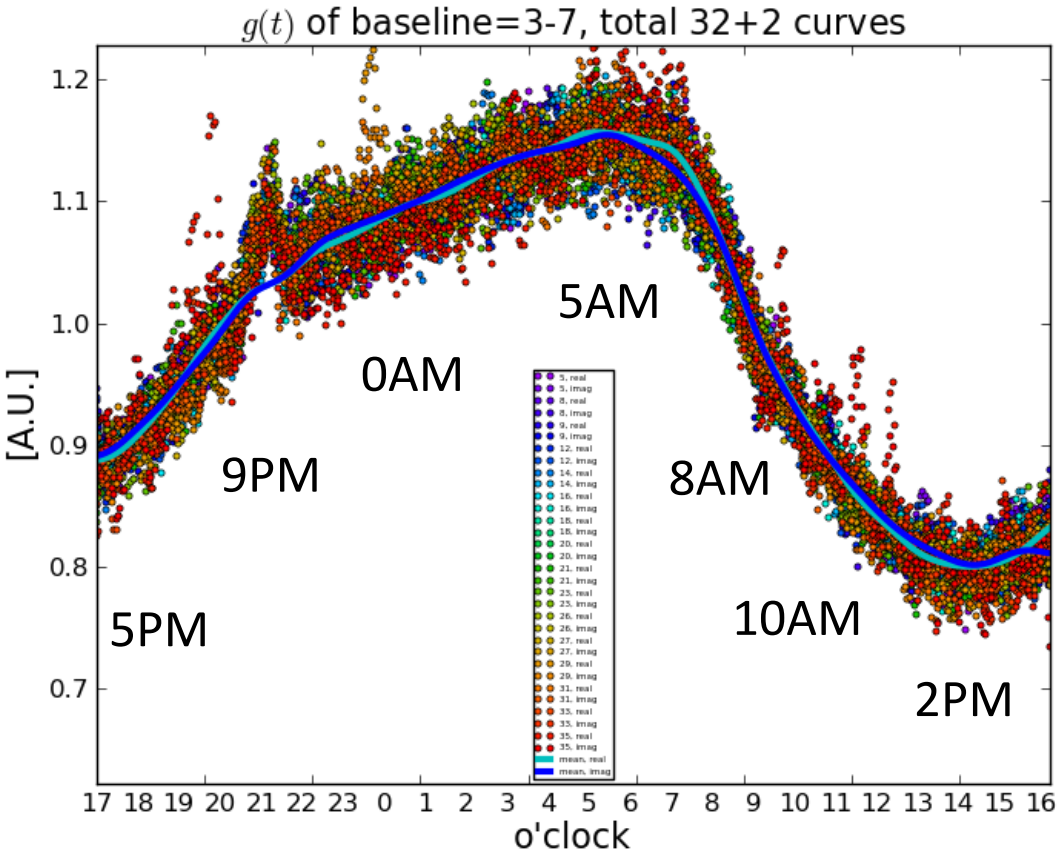
(1) Calculate the moving average

(2) Get the sigma of the data residual (original data minus moving average)

(3) Do (1) and (2) again until reach the threshold (stopping condition)

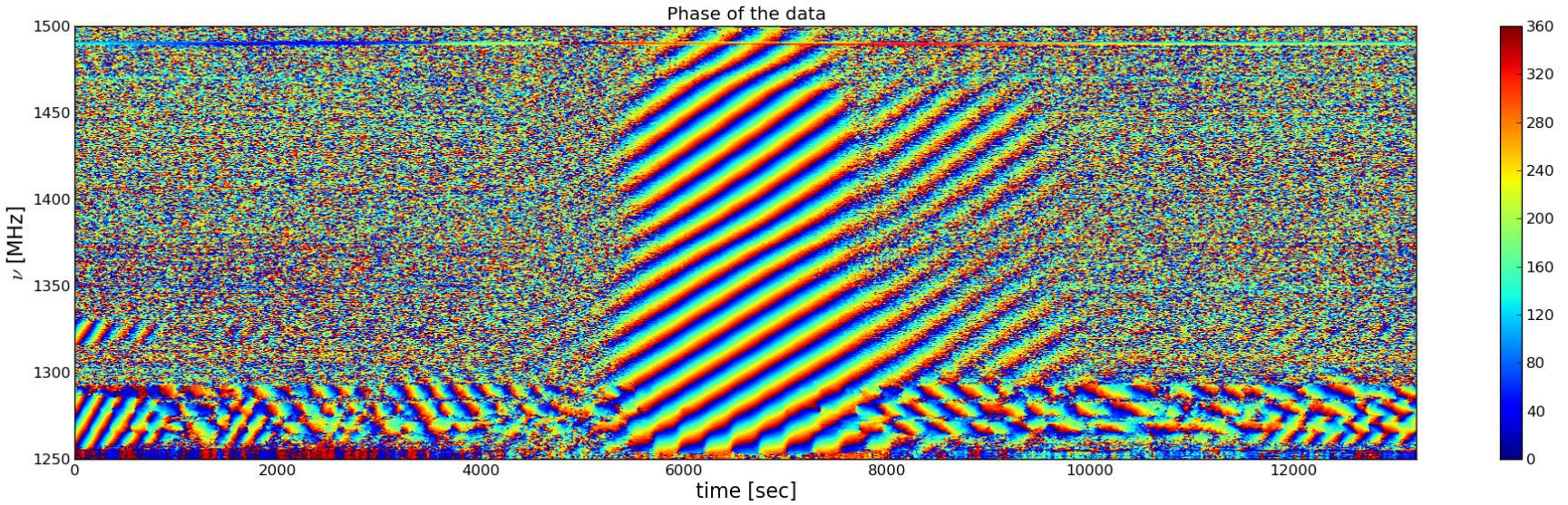
G(t)

Here actually the sigma of the noise.
If we assume the system temperature is stable/unchanging,
then the sigma of the noise traces the G(t) (gain varies with time)



Total phase

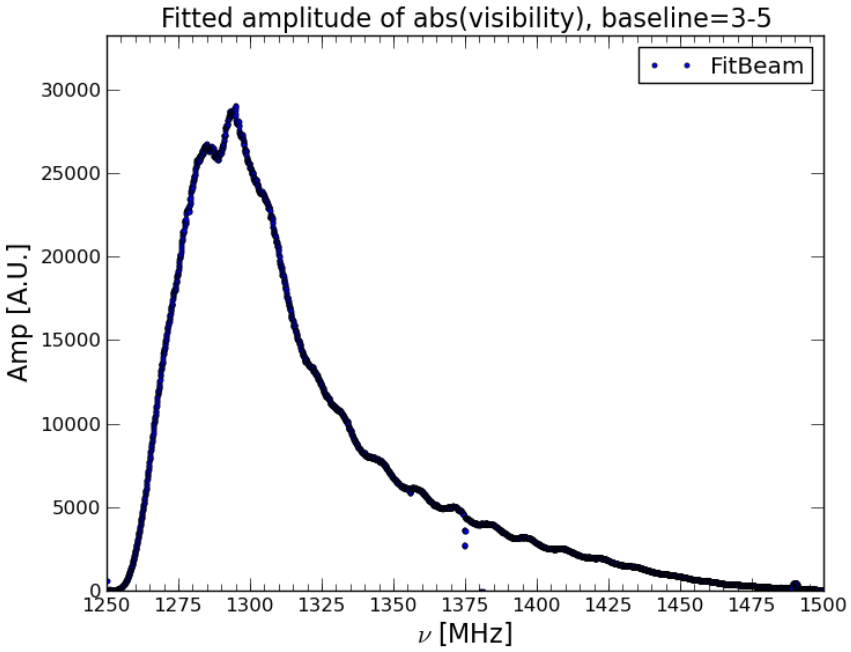
Here shows the phase of the data.
We can see the phase of the CygA clearly
And also the CygX (a little)
We can check the correlation noise from the phase here, it seems low.



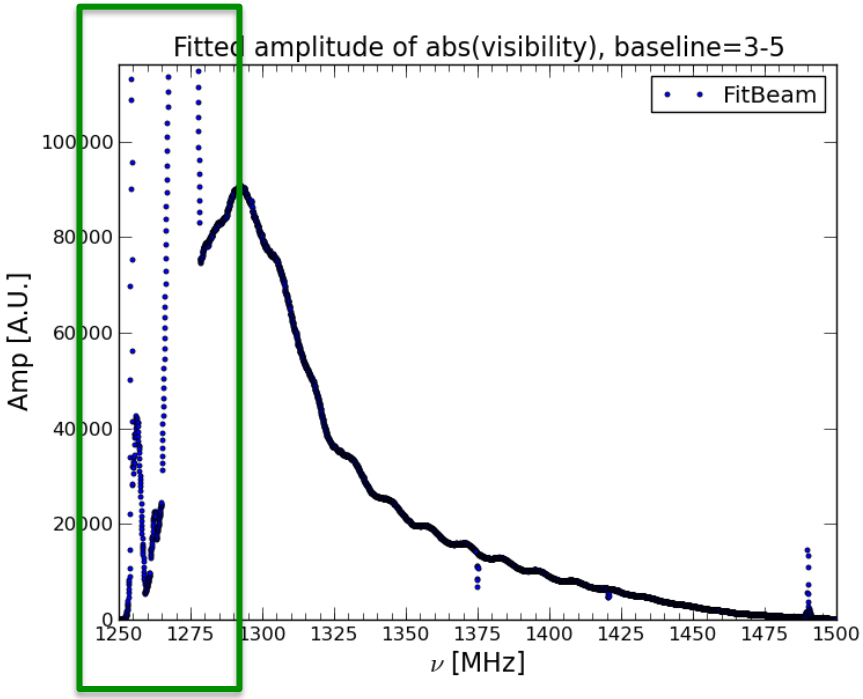
g(nu)

Below, I will show the results from two data set
One is CygA, the other is CasA, on different date

CygA6sep16

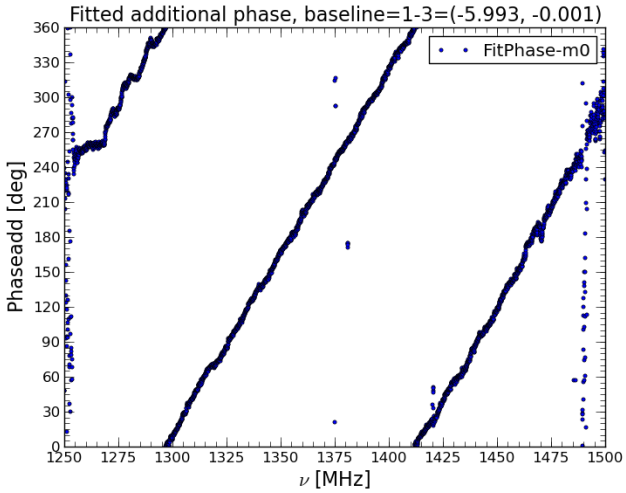


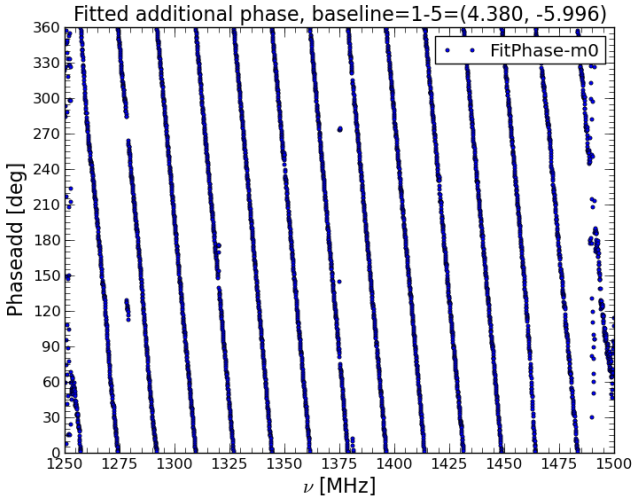
CasA29sep16



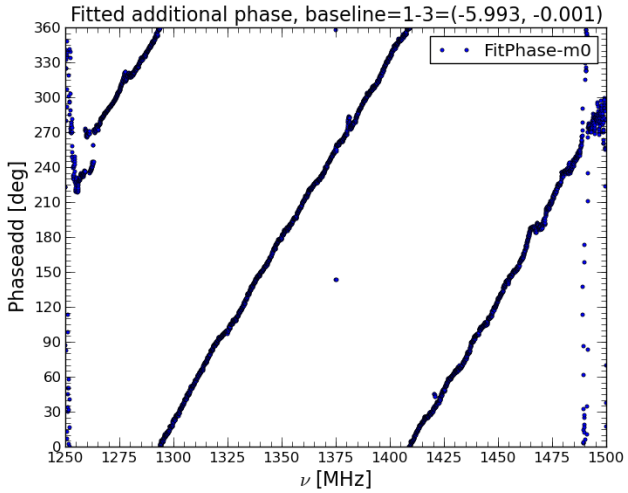
Phase calibration (1)

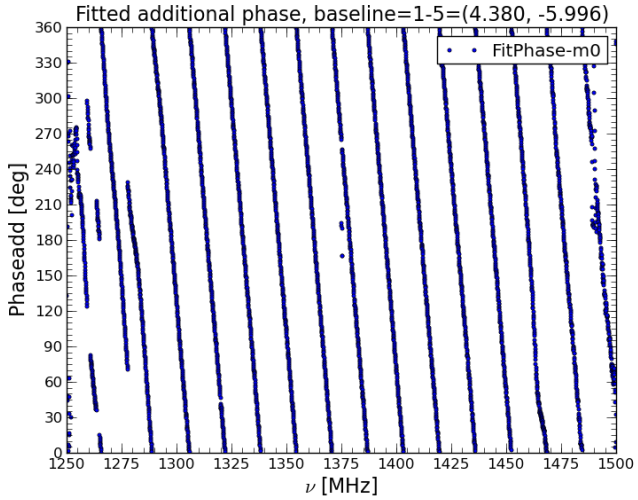
CygA6sep16





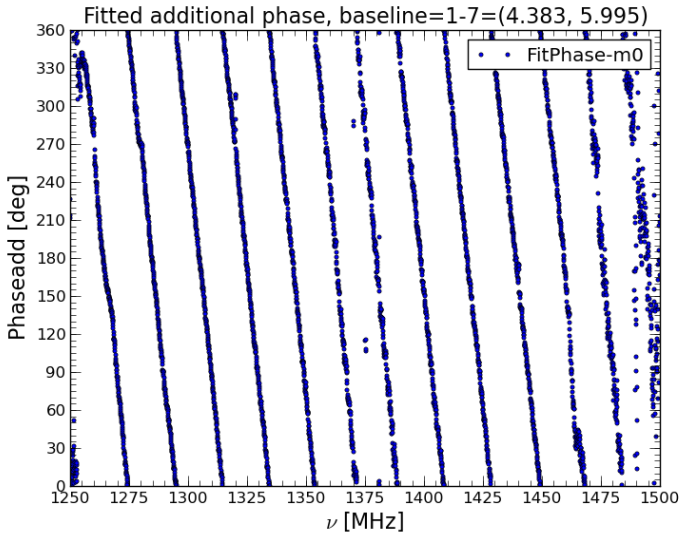
CasA29sep16

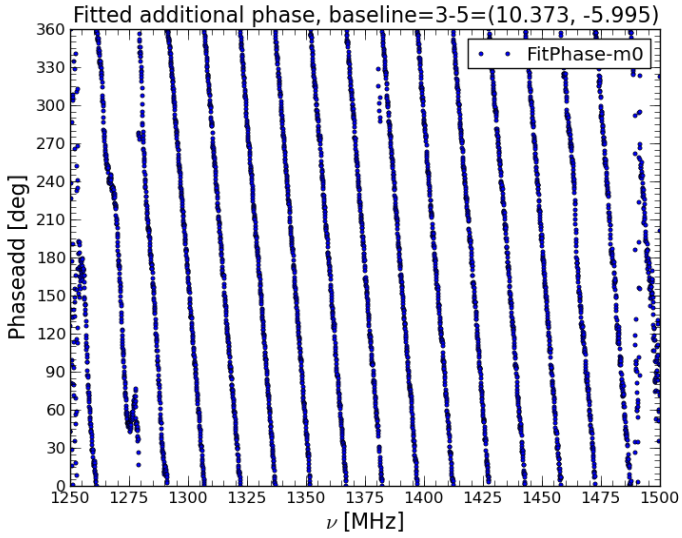




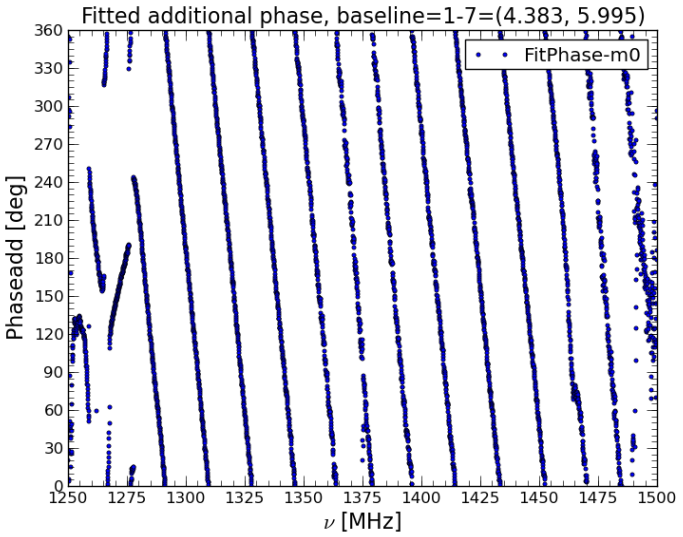
Phase calibration (2)

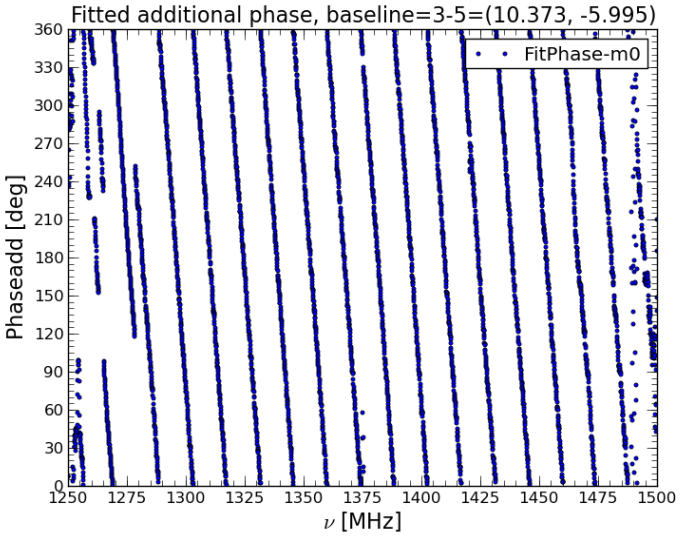
CygA6sep16





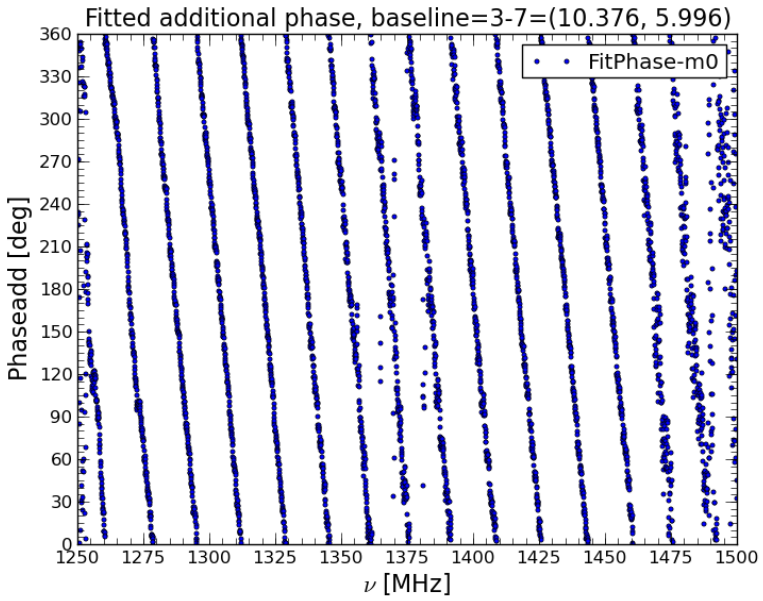
CasA29sep16



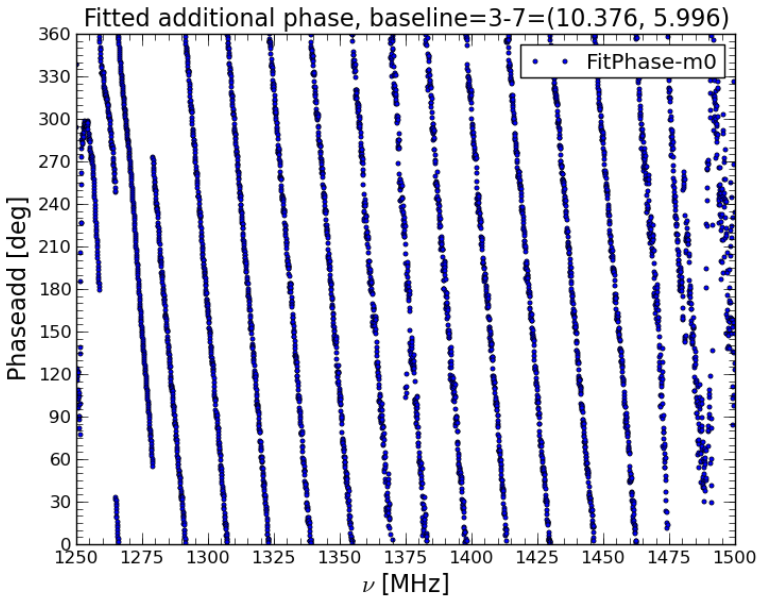


Phase calibration (3)

CygA6sep16

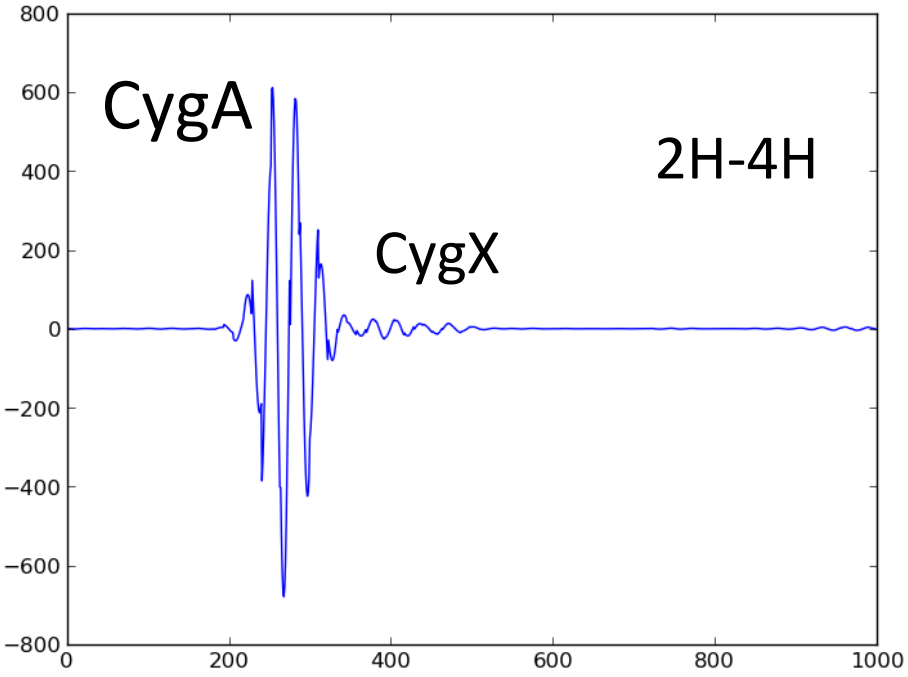


CasA29sep16

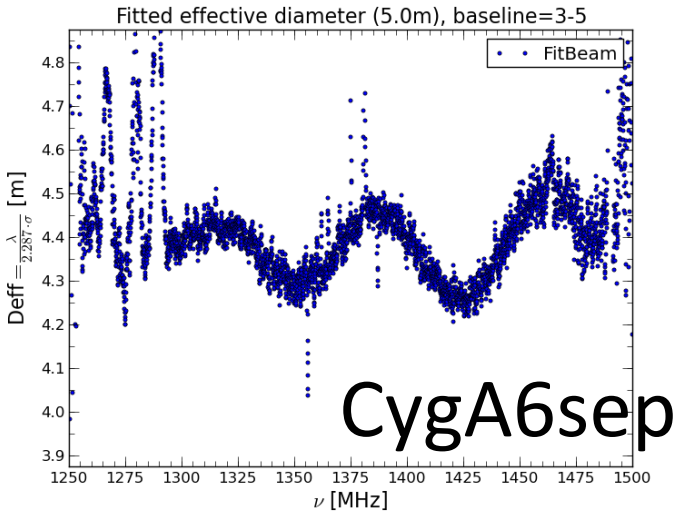


Slope of the phase

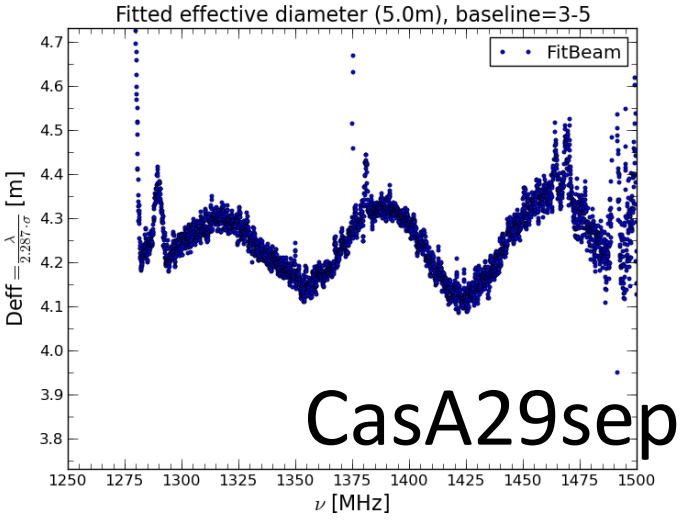
- The phase I fitted above changes too fast with frequency (the slope is large)
- I can't find why.
- I check the formula I used to fit, the simulation is as below, it seems good



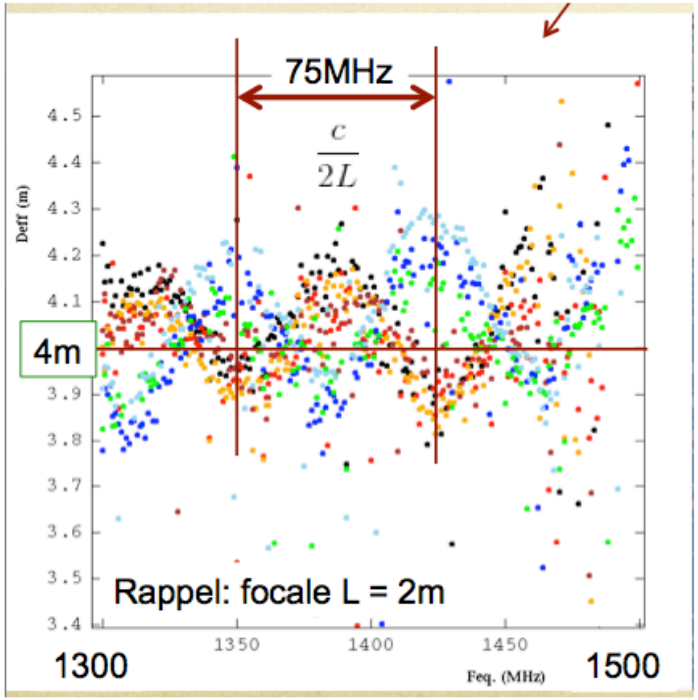
Deff



CygA6sep16



CasA29sep16



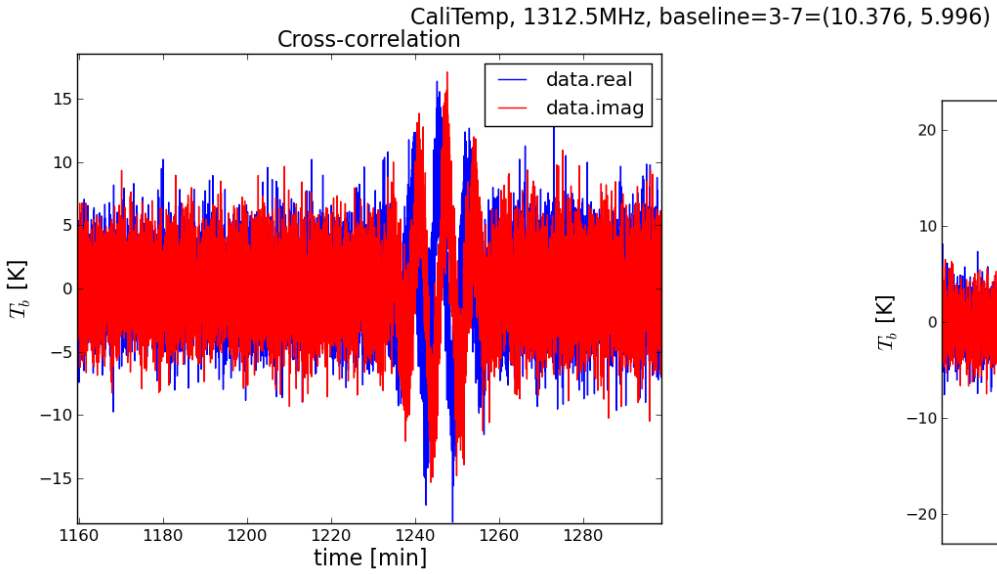
The focal distance is L=2m. I have noticed that the H and V polarizations are shifted by 1/2-period.

(Nb. This feature of Deff oscillation was not due to FFT-coefficient modification to get mean=0.)

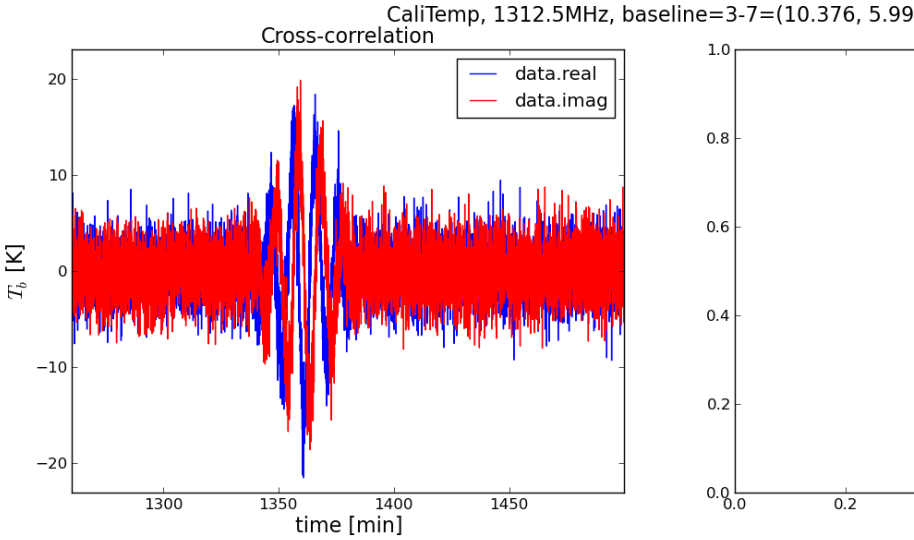
This can certainly be seen also in the TIANLAI dishes.

Calibrating amplitude

CygA6sep16



CasA29sep16



Is the signal to noise of these data more or less not enough ?

END