

Preliminary Fringe Fitting of Chang'E-3 VLBI Observations with PIMA

First International Workshop on
VLBI Observations of Near-field Targets

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Bonn, Germany
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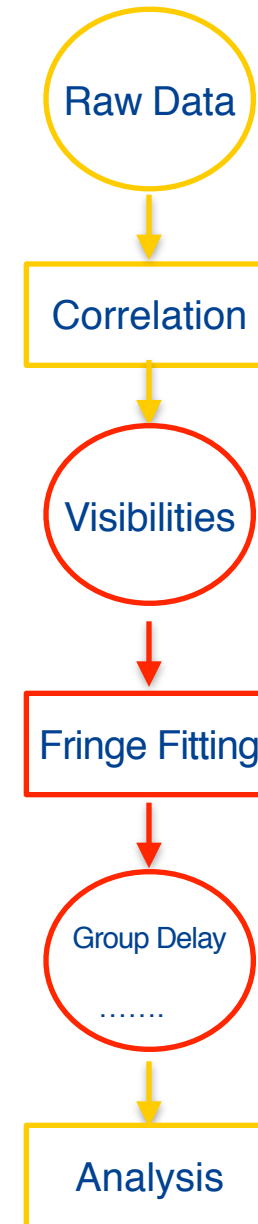


1. Brief Introduction to Fringe Fitting
2. PIMA algorithm
3. Comparison between PIMA and fourfit
4. Chang'E-3 Observations with PIMA
5. Summary

Why fringe fitting ?

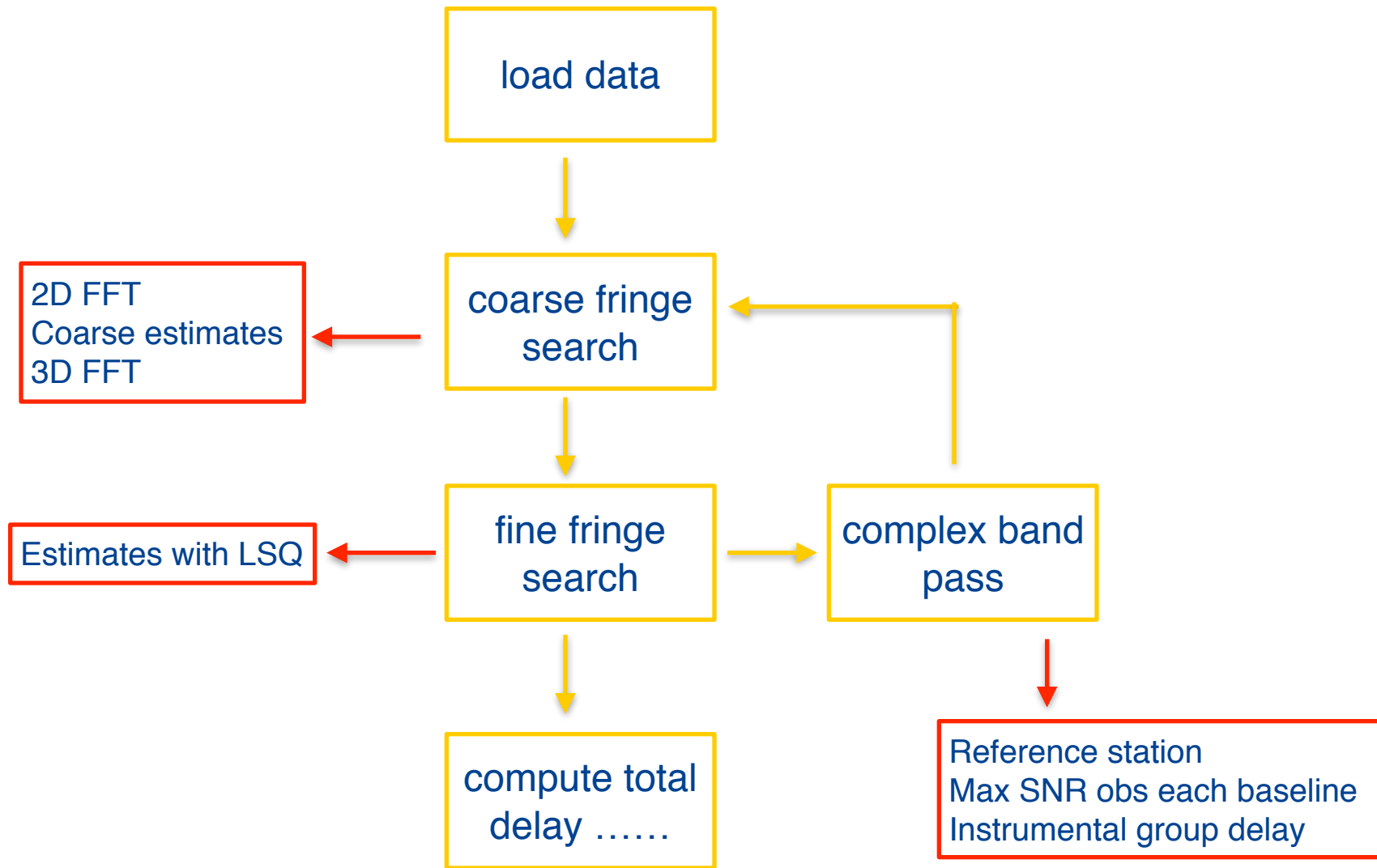
Remove remaining non-random signatures
caused by:

Correlation models
Antenna models and locations
Source positions
Atmosphere and ionosphere
GPS clocks
.....



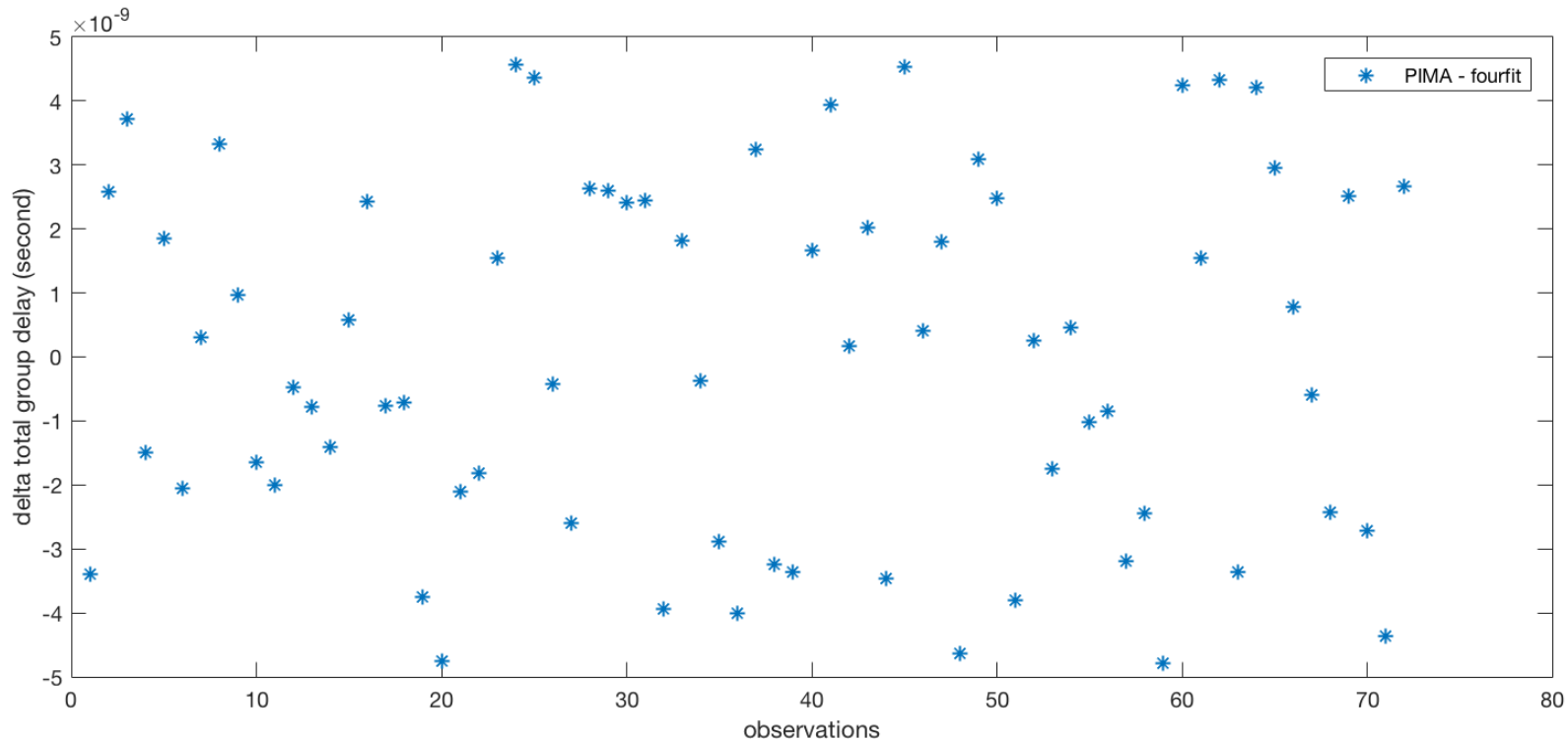
- Standard Baseline Based
 - FFT the visibility data
 - Locate peaks in delay, fringe rate space
 - Correct phases
- Global Fringe Fitting
 - Use all data for calculations
 - FFT with baseline stacking
 - LSQ fitting

- PIMA is a software package for determining group delays from wide-band data. (L. Petrov et al. 2011)
- Complimentary to HOPS(fourfit), AIPS.
- Wide-band fringe fitting across all of the IF's within the band.



| | <i>PIMA</i> | <i>fourfit</i> |
|------------------------|---|--|
| <i>Delay reference</i> | <i>Geocentric 1st-station Chosen</i> | <i>Geocentric output 1st-station stored</i> |
| <i>Reference time</i> | <i>SRT FRT by set</i> | <i>SRT=FRT all obs same in scan</i> |

SRT : scan reference time
FRT : fringe reference time

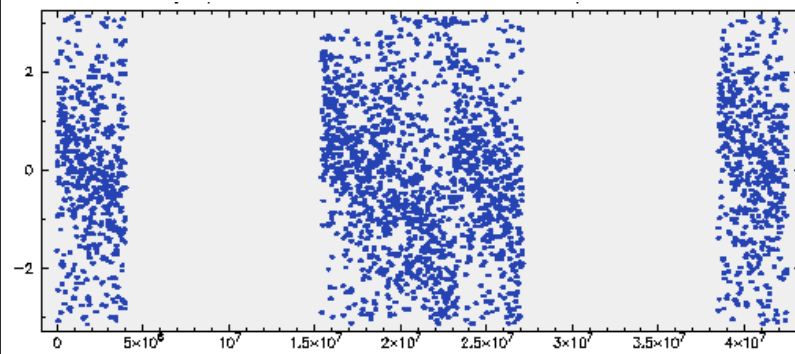


PIMA - fourfit delta total group delay 72 observations in session K16123

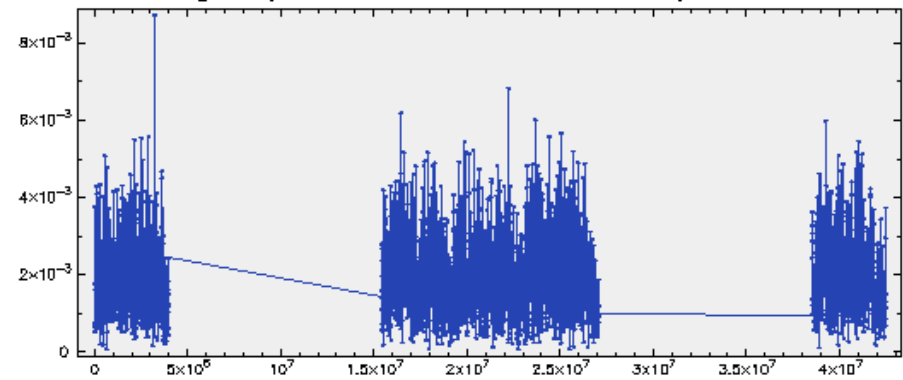
Observations used from session RD1507.

Both phase referencing and lunar lander observations in X band.

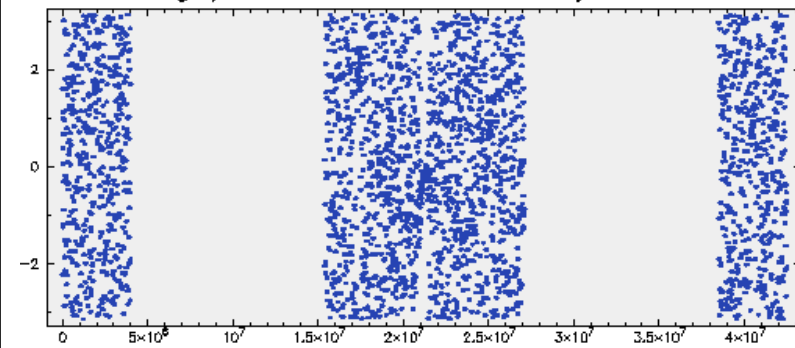
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chan_def = &X : 8212.99 MHz : U : 4.000 MHz
chan_def = &X : 8212.99 MHz : L : 4.000 MHz
chan_def = &X : 8252.99 MHz : U : 4.000 MHz
chan_def = &X : 8448.75 MHz : U : 4.000 MHz
chan_def = &X : 8464.15 MHz : U : 4.000 MHz
chan_def = &X : 8468.00 MHz : U : 4.000 MHz
chan_def = &X : 8471.85 MHz : U : 4.000 MHz
chan_def = &X : 8487.25 MHz : U : 4.000 MHz
chan_def = &X : 8492.00 MHz : U : 4.000 MHz
chan_def = &X : 8492.00 MHz : L : 4.000 MHz
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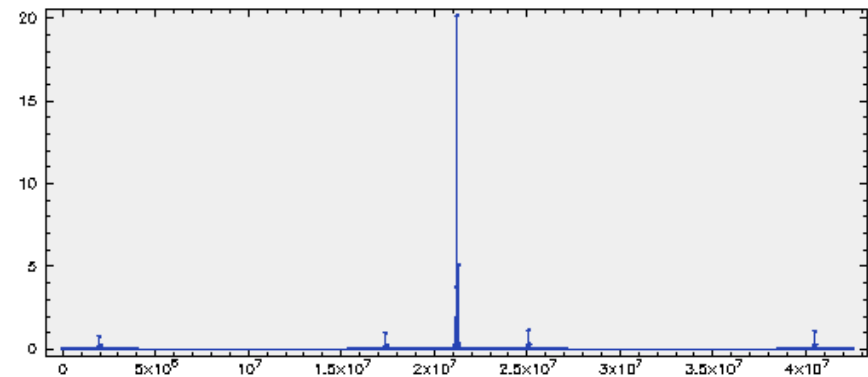
1. Fringe phase for quasar observation.



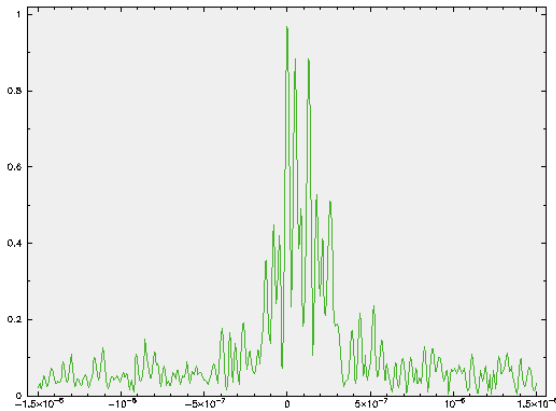
2. Fringe amplitude for quasar observation.



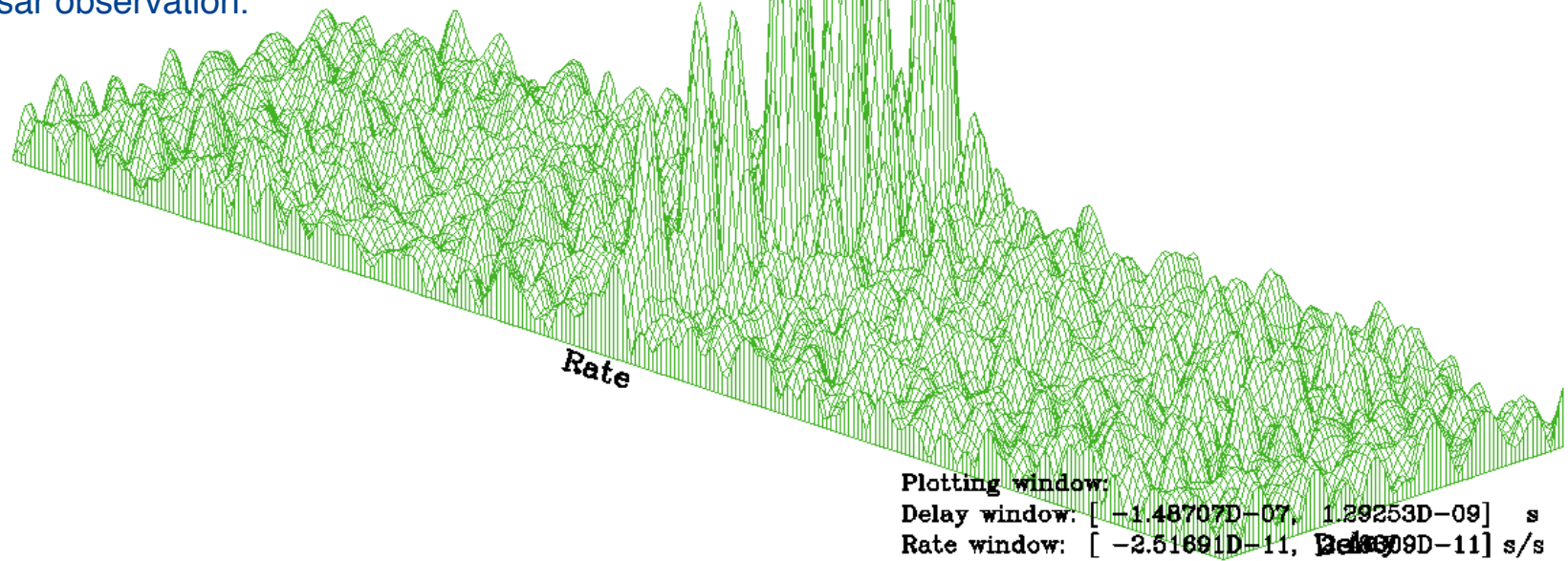
3. Fringe phase for lunar lander observation.



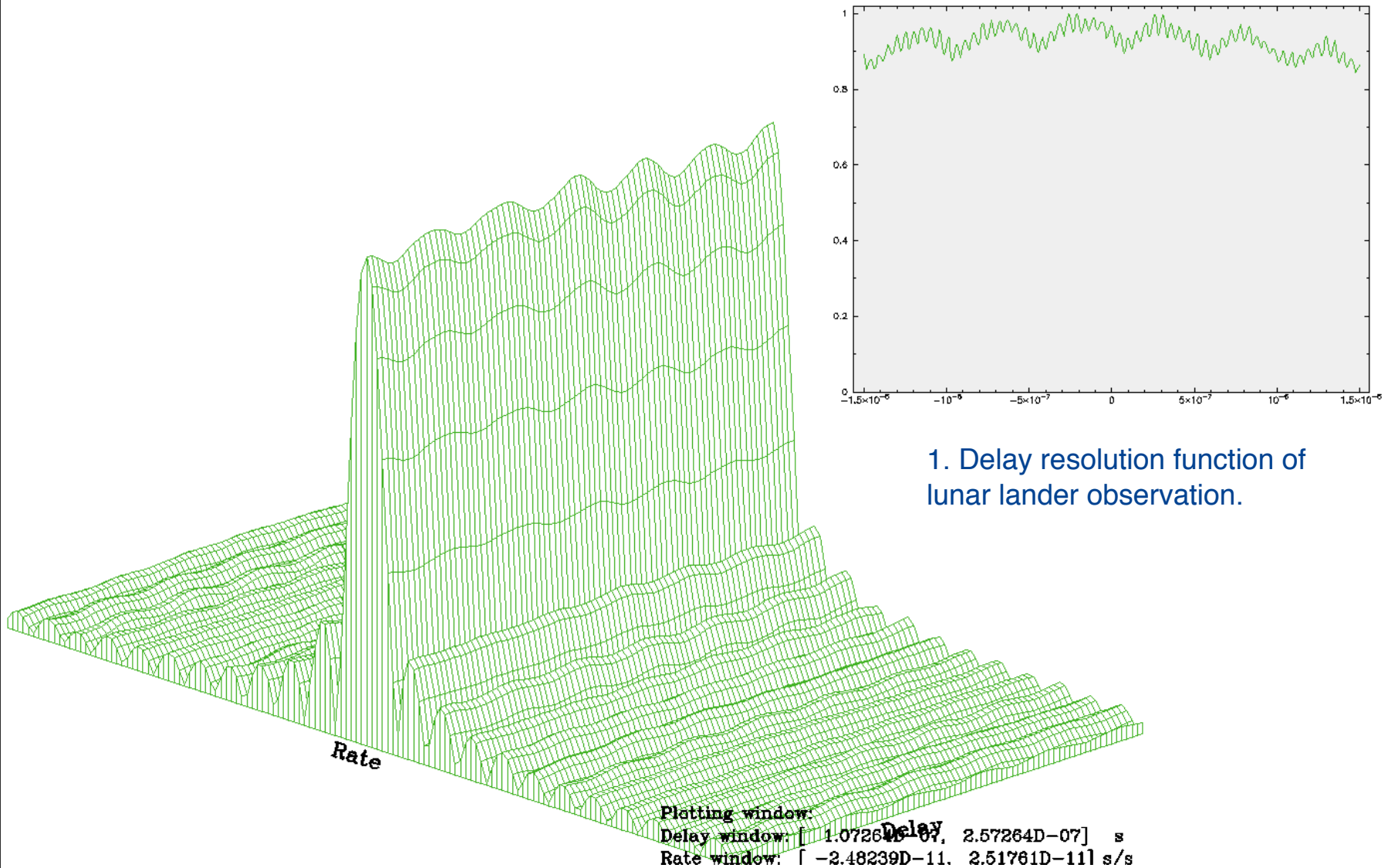
4. Fringe amplitude for lunar lander observation.



1. Delay resolution function of quasar observation.

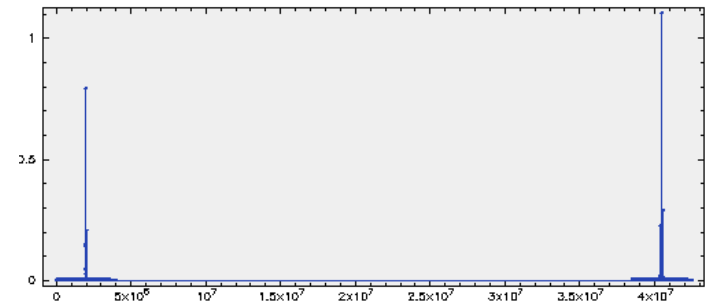
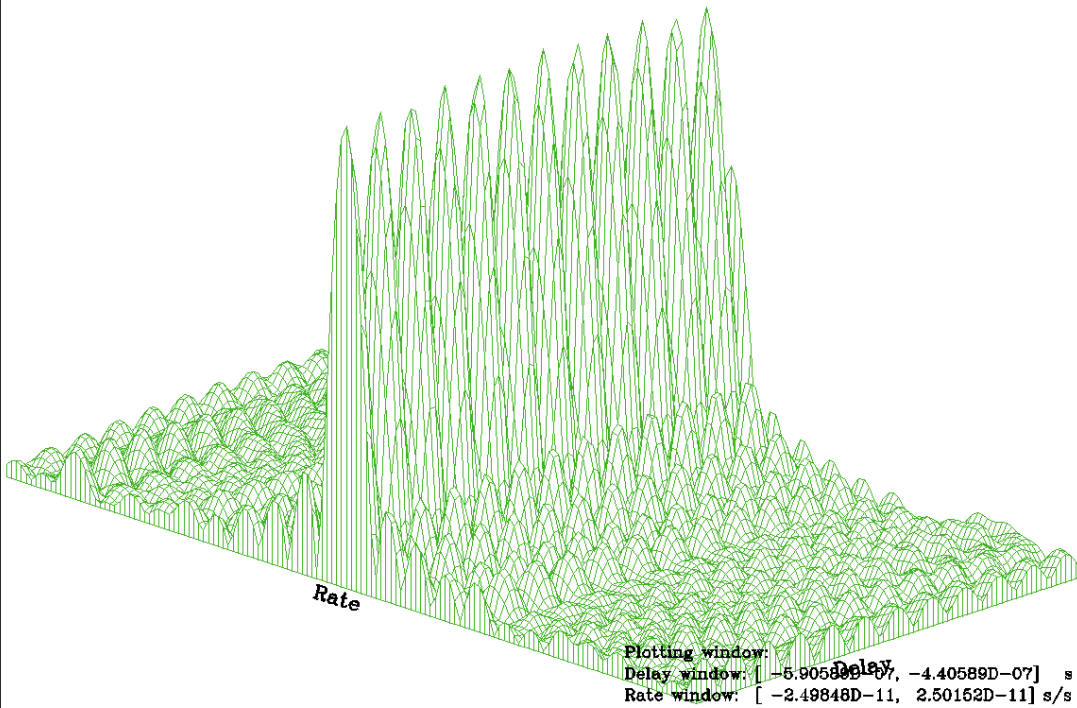
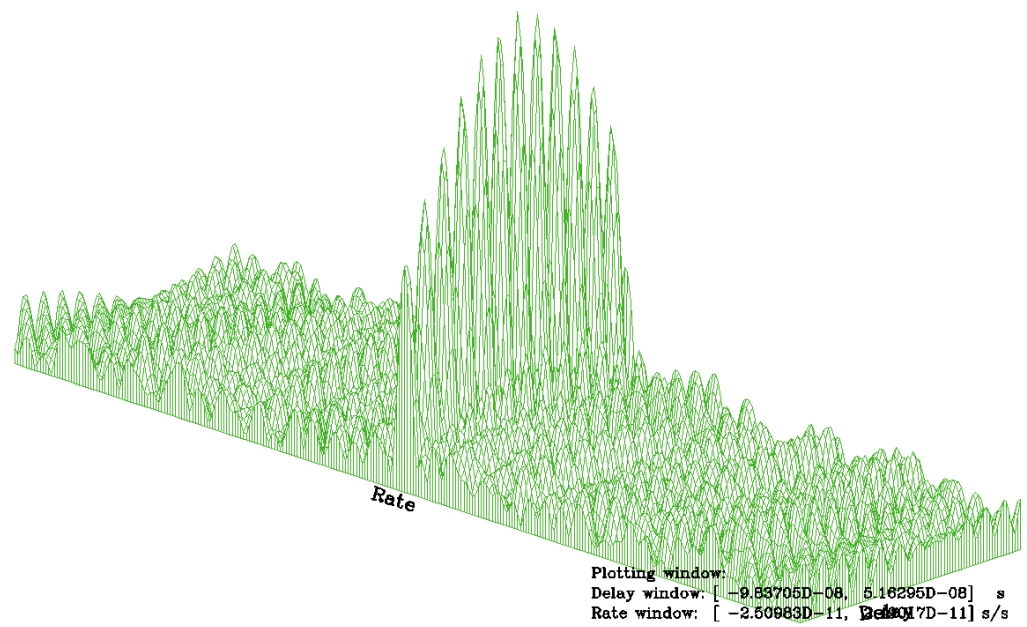
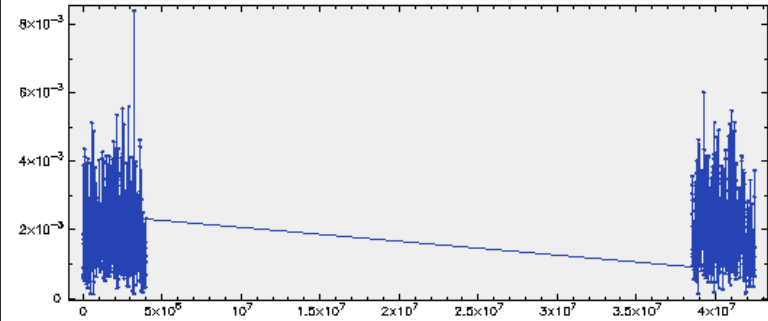


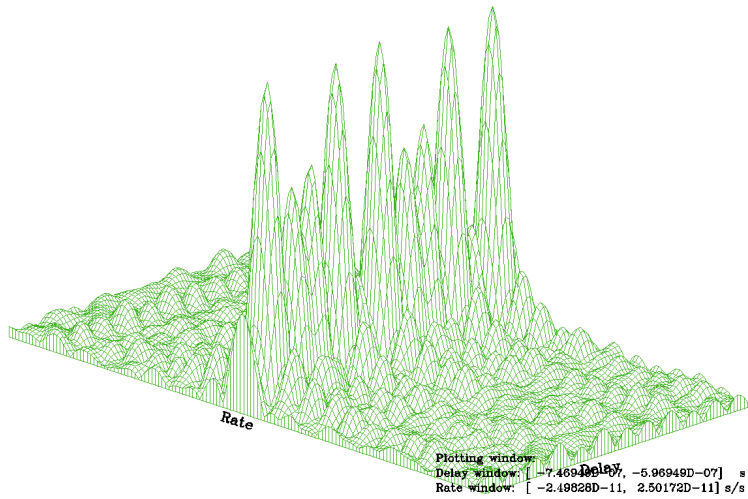
2. Delay and delay rate of quasar observation.



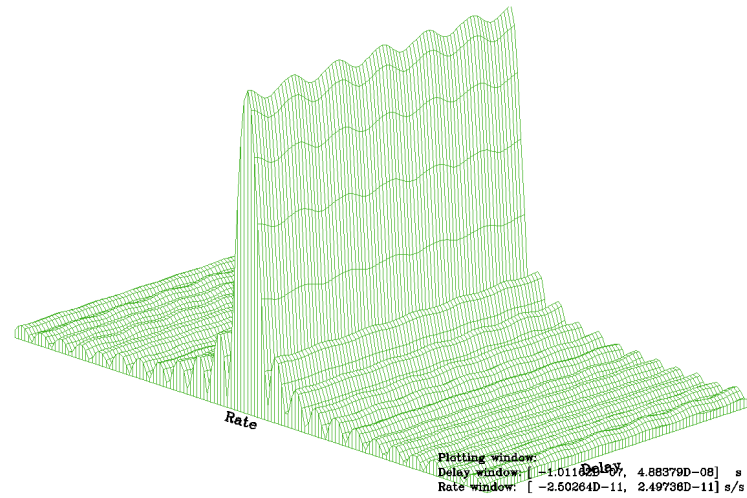
1. Delay resolution function of lunar lander observation.

2. Delay and delay rate of lunar lander observation.

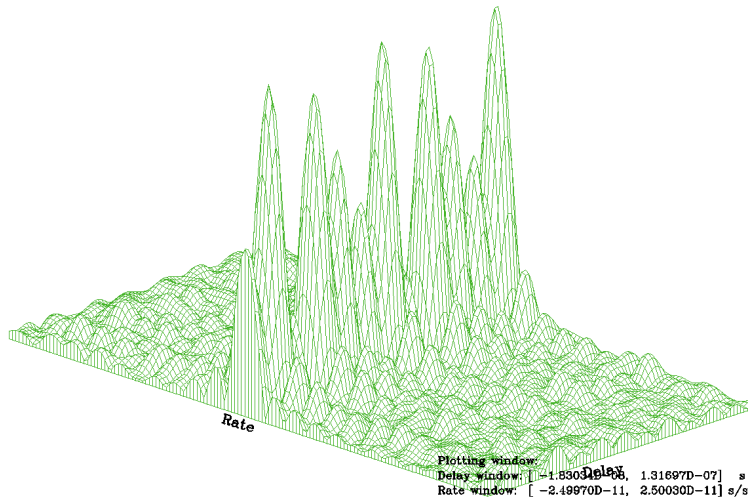




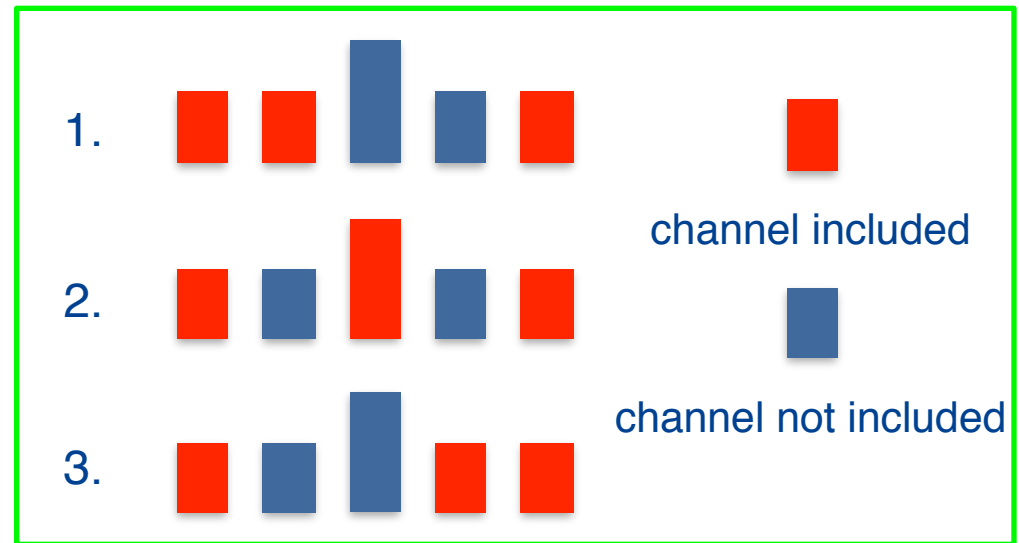
1.

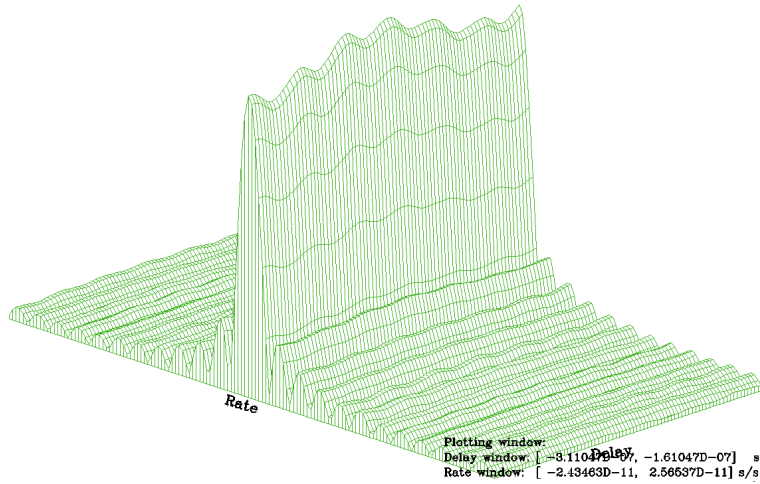


2.

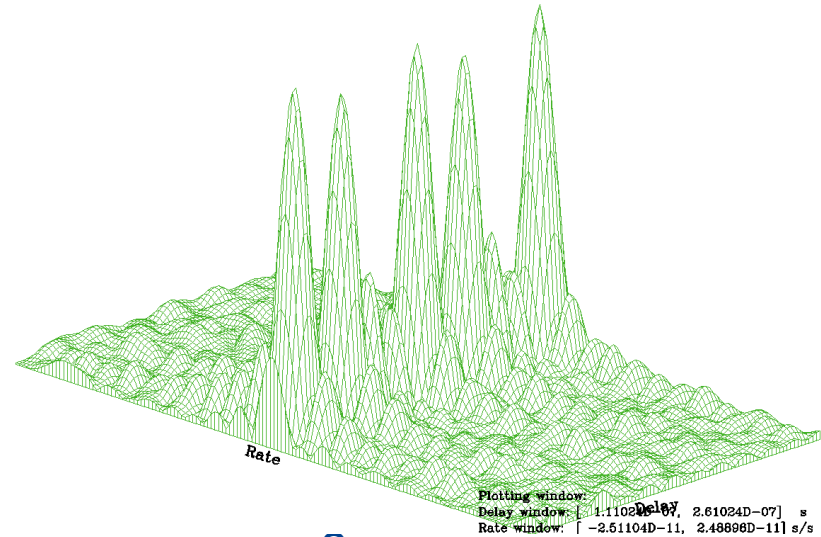


3.

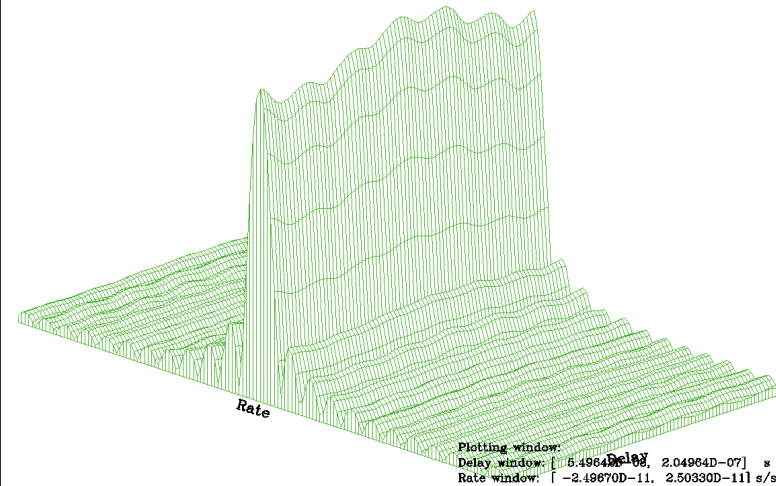




1.

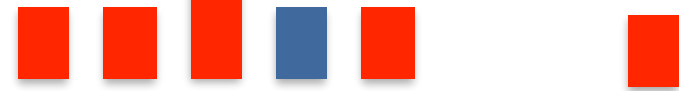


2.



3.

1.



2.

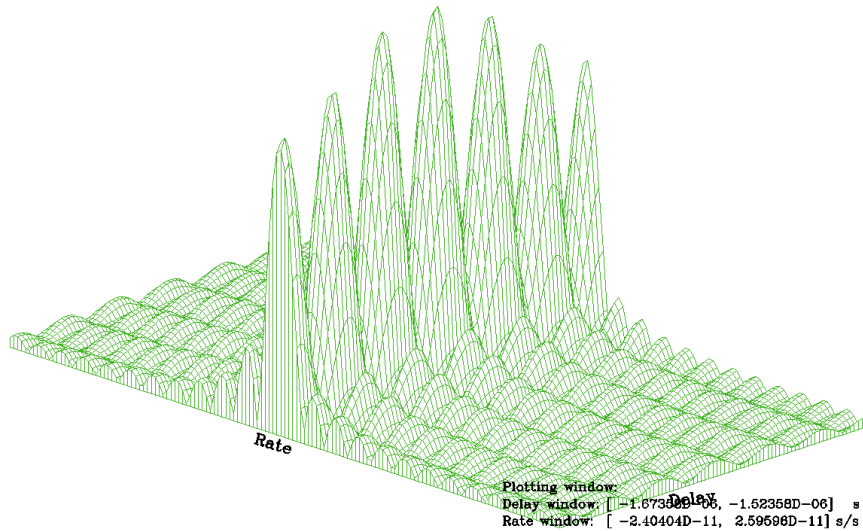


3.

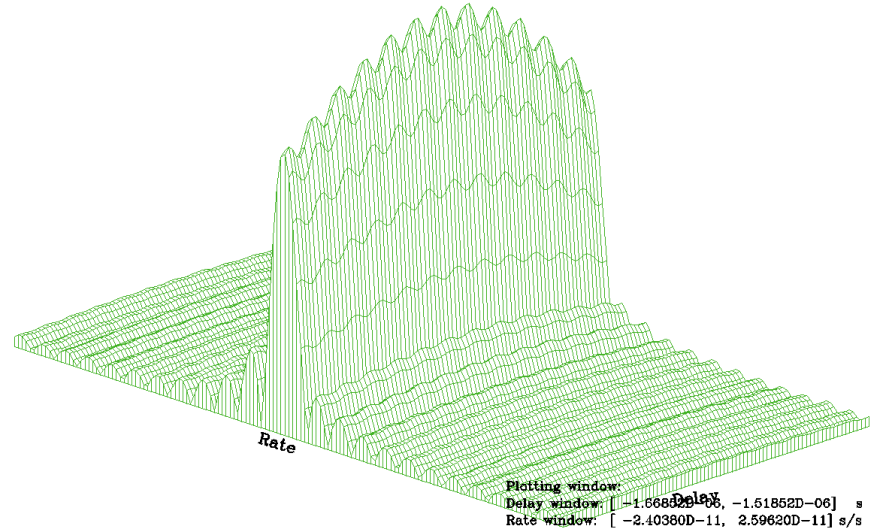


channel included

channel not included



5 channels, SNR :122.6



2 channels, SNR :750.8

- PIMA fourfit differences
- With different channels
- High SNR observations
- ‘Flat’ phenomenon reasonable? results reliable?

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Thanks for your attention!

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