ALMA – GMVA obs. Mode I

- ALMA: 32x 62.5 MHz in X/Y pol
  - Usable: 51.2 MHz due to overlapping sub-bands
  - 16 Gbps Mark 6 recording
- VLBA: 2x 128 MHz in R/L pol
  - |----------|----------| 2x 128 MHz VLBA
  - |-----|-----|-----|-----| 4x 62.5 MHz ALMA
  - 2 Gbps Mark 5C
- DBBC2: 512 MHz in R/L pol (no sub-bands)

  Has to overlap with VLBA band

ALMA – GMVA obs. Mode II

- VLBA freqs:
  - `sample_rate = 256.000 Ms/sec;  * (2bits/sample)`
  - `chan_def = : 86140.00 MHz : U : 128.00 MHz : &CH01 : &BBC01 : &NoCal; *Rcp`
  - `chan_def = : 86140.00 MHz : U : 128.00 MHz : &CH02 : &BBC02 : &NoCal; *Lcp`
  - `chan_def = : 86268.00 MHz : U : 128.00 MHz : &CH03 : &BBC03 : &NoCal; *Rcp`
  - `chan_def = : 86268.00 MHz : U : 128.00 MHz : &CH04 : &BBC04 : &NoCal; *Lcp`
- Band starts at lower edge of normal GMVA mode!
  - `sample_rate = 1024 Ms/sec;  * (2bits/sample) * 512 MHz BW!!`
  - `chan_def = : 86524.00 MHz : L : 512.00 MHz : &CH01 : &BBC01 : &U_Cal; *Rcp`
  - `chan_def = : 86524.00 MHz : L : 512.00 MHz : &CH02 : &BBC02 : &U_Cal; *Lcp`
    - Corresponds to 86012.00 MHz @lower edge

ALMA – GMVA correlation

- LSB will be converted automatically to USB
- Use “zoom” mode in correlation to split VLBA/EVN bands
- Due to different sampling rates → funny freqs.
  - 86330.290625 MHz bw 51.2 MHz
  - 86271.696875 MHz bw 51.2 MHz
  - 86213.103125 MHz bw 51.2 MHz
  - 86154.509375 MHz bw 51.2 MHz
    - All lower edges!

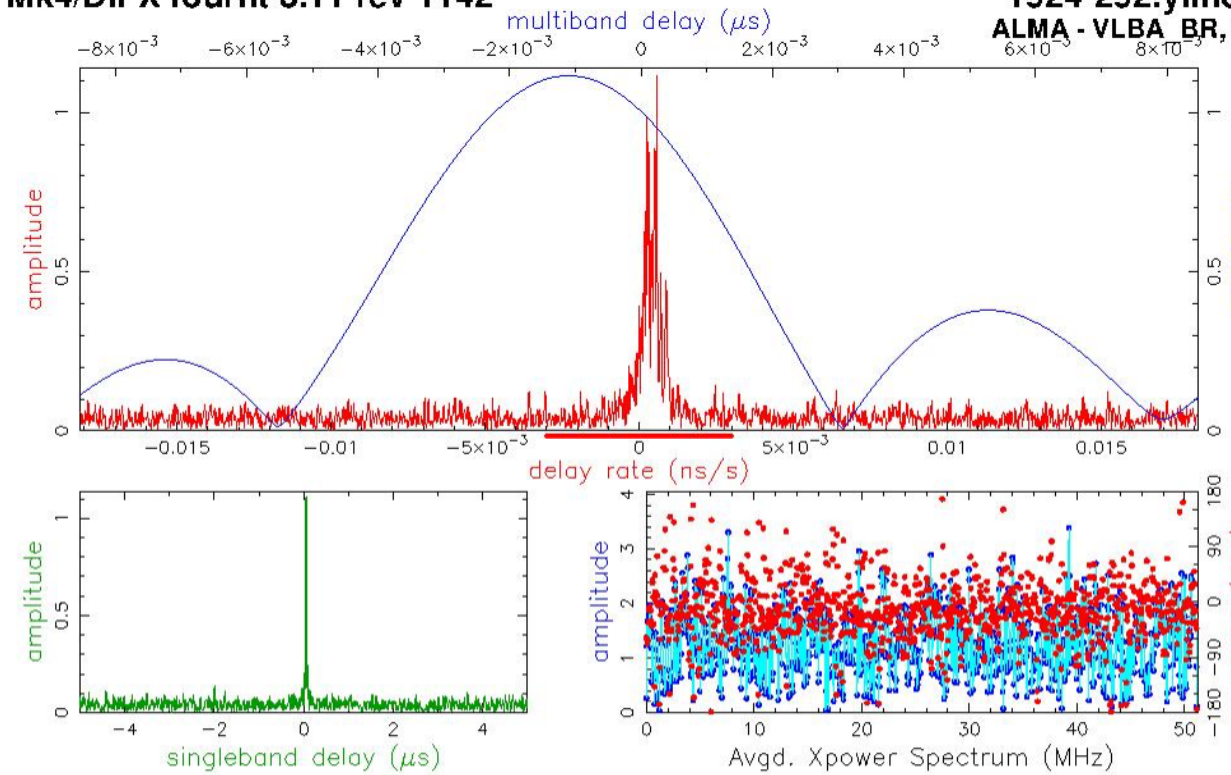
ALMA – GMVA obs. test

- Test done with VLBA, ALMA, Effelsberg
- Fringes found:
  - VLBA – ALMA
  - VLBA – Effelsberg (RDBE)
    - Bug in DBBC2 512 MHz DSC mode
- Conversion of XX, YY, XY, YX, RY, LY, RX, LX...
  - `polconvert` after correlation (OSO, Marti-Vidal)
- Further analysis at Haystack (Mathews)

Mk4/DiFX fourfit 3.11 rev 1142

1924-292.yllhcl, No0012, tb

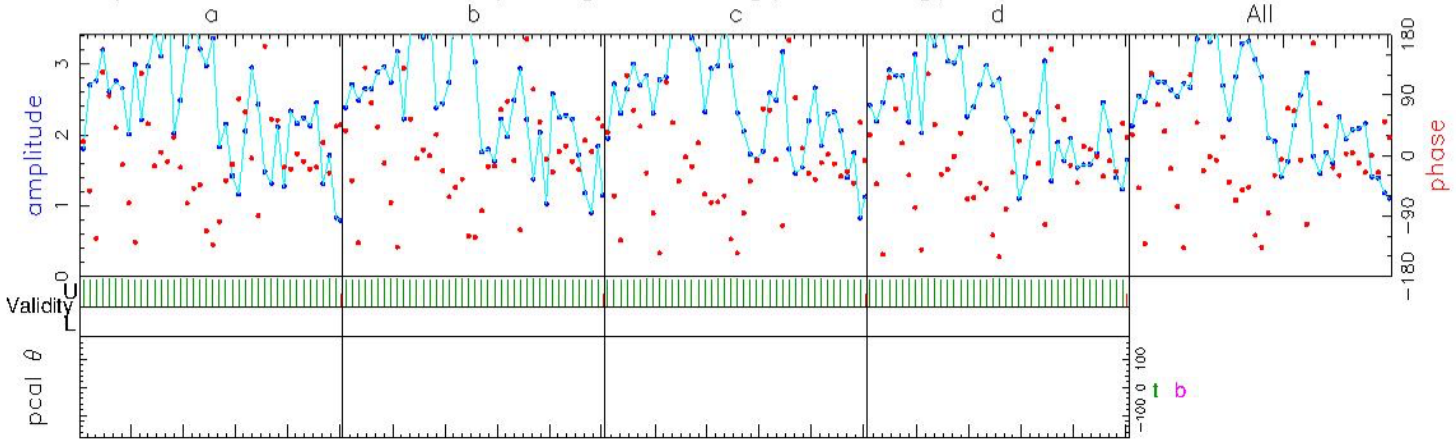
ALMA - VLBA_BR, fgroup W, pol RR



Fringe quality 7
Error code H
SNR 34.0
Int time 297.841
Amp 1.139
Phase -15.9
PFD 0.0e+00
Delays (us)
SBD 0.051486
MBD -0.001088
Fringe rate (Hz)
0.048641
Ion TEC 0.00
Ref freq (MHz)
86154.5094
AP (sec) 0.320

Exp. bm434a
Exper # 16383
Yr:day 2015:213
Start 074001.92
Stop 074459.84
FRT 074230.00
Corr/FF/build
2015:293:124035
2015:316:120900
2015:156:114148
RA & Dec (J2000)
19h24m51.0560s
-29°14'30.121"

Amp. and Phase vs. time for each freq., 41 segs, 23 APs / seg (7.36 sec / seg.), time ticks 10 sec



86154.51	86213.10	86271.70	86330.29	Freq (MHz)	All
-17.6	-8.2	-24.0	-13.2	Phase	-15.9
1.2	1.1	1.2	1.1	Ampl.	1.1

GMVA tests – ALMA mode

- At present: debugging of 512 MHz DSC mode
  - Local at Effelsberg: RDBE, DBBC2 (Mark 5B+), DBBC2 (FiLA10G → Mark 6/Flexbuff)
  - Additional problem with Mark 6, JIVE5abc6 and 4 Gbps: lost packets
    - Additional test with Haystack Mark 6 software planned
- GMVA-wide test at the end of next 2 sessions
  - May session: 4 hours with:
    - VLBA, GBT, On, Mh, Eb, Ys

GMVA tests

- New PFB firmware will be used (incl. DSC mode)
- Setup for FiLA10G different:
  - 2 VDIF threads (L&R) via 2 streams
    - Can be combined standalone or by correlator software
- Recipe and firmware will be distributed asap