

CORRELATOR SCIENCE OPERATIONS REPORT, EVN MkIV & SFXC DATA PROCESSORS AT JIVE
EVN TOG MEETING, June 2012, Onsala

20 June 2012 (statistics cover 21 August 2011 - 20 June 2012)

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SCIENCE OPERATIONS

Sessions and their Experiments

The table below summarizes projects correlated, distributed, and released from 21 August 2011 to 20 June 2012. The table lists the number of experiments as well as the network hours and correlator hours for both user and test/NME experiments. Here, correlator hours are the network hours multiplied by any multiple correlation passes required.

	User Experiments			Test & Network Monitoring		
	N	Ntwk_hr	Corr_hr	N	Ntwk_hr	Corr_hr
Correlated	84	689	887	29	94	94
Distributed	77	613	827	28	91	91
Released	69	543	711	24	87	87

The following table summarizes by session the user experiments with activity since the previous TOG meeting, with an additional column for experiments not yet distributed (entries = remaining to do / total).

	N_to.corr	Corr.hrs	N_to.dist	
session 2/2011(d)	0/21	0/269hr	0/21	12 user exps. on SFXC
Aug-Oct e-VLBI	0/7	0/30hr	0/7	
session 3/2011(e)	0/5	0/55hr	0/5	
session 3/2011(d)	0/20	0/289hr	1/20	13 user exps. on SFXC
Nov-Feb e-VLBI	0/11	0/54hr	0/11	
session 1/2012(d)	0/14	0/147hr	3/14	13 user exps. on SFXC
Mar-May e-VLBI	0/4	0/43hr	0/4	
session 2/2012(e)	0/5	0/56hr	4/5	
session 2/2012(d)	13/13	133/133hr	13/13	(estimated corr.hrs.)
June e-VLBI	0/3	0/16hr	3/3	(19-20 June)

Some landmarks since the previous TOG report:

9 stations (Ef, Wb, Ys, Ur, Sh, Hh, Sv, Zc, Bd) currently provide Mark5B recordings in disk sessions.

First fringes to Korean VLBI Network stations on 19 Oct: e-VLBI including Onsala, Yebes, Yonsei, and Tamna at K-band. Data transmission rates from Korea up to 512 Mbps.

First fringes to Noto following their antenna repair, in the ftp-fringe test of the 5cm NME of session 1/2012 (23 Feb).

First fringes to Irbene in a test observation on 12 April (512 Mbps, C-band). e-VLBI: Medicina and Yebes attained full Gbps (1024Mbps) without the need to use channel-dropping. First e-VLBI fringes to Noto in EG065A on 15 May (512 Mbps).

KVAZAR stations used their new R1002 digital back-ends exclusively starting in session 1/2012.

Onsala, Hartebeesthoek, and Shanghai recorded using both analog and digital back-ends in various N*/F* experiments in session 1/2012 (On = DBBC, Hh = 2x DBBC, Sh = CDAS). See the attached 4 viewgraphs I prepared for Huib's talk at the May 2012 JIVE board meeting for a summary and plots of amplitude and phase across the passbands (these all use 8MHz filters).

Astronomical Features:

The current play-back line-up is 14 Mark5As, 2 Mark5Bs, 1 Mark5B+, and 7 Mark5Cs (possible to jump from one Mark5 'flavor' to another, with various selection rules/transition probabilities applying to the possible transmutations). The MkIV correlator is still limited to a maximum of 16 stations for a single pass. SFXC can instead accept 24 stations, with the further advantage of not having to worry about the Mark5-flavor of the participating play-back drives.

Session 1/2012 had only one user experiment to correlate on the MkIV, which may well prove to be the last disk-based experiment that we ever correlate on the MkIV. e-VLBI continues to run on the MkIV for now. Experiments running on SFXC have begun to take advantage of the new features it enables: single-pass correlation of more than 16 stations, pulsar gating/binning, more than 2048 frequency points across each subband/polarization (the current record is 8192), combinations of number of stations, subbands, polarizations, and frequency points that would not have fit on the MkIV, and multiple phase centers in a single pass. Aard will talk about the primary beam corrections that can become important in wide-field mapping applications that are enabled by SFXC. In test observations, we have also got fringes from 32MHz subbands (CDAS) on SFXC, which would be impossible on the MkIV.

NETWORK SUPPORT

The use of ftp fringe-test scans continues in NME or F* observations. We continue to post pipeline results on the EVN Archive. The pipeline provides feedback on stations' general performance and in particular on their gain corrections, and identifies stations/frequency bands with particular problems. Jun will present a more detailed calibration reports in his presentations. One aspect that is affecting is the DBBC/DDC 16MHz filter cutting off approximately 1.3MHz from the upper and lower edges of the band. See the last page for a plot of autocorrelation passbands for a lower/upper-sideband pair for a clock-searching scan from EY018A (session 1/2012, C-band), including stations with various sorts of back-ends (DBBC, TADU-max, Mark4, R1002).

Since starting to use the R1002 back-ends, the C-band Gbps problems at KVAZAR stations have disappeared (Sv no longer cuts off at 5000MHz, no RFI due to down-converting at Zc). The point I raised a couple TOG meetings ago about looking into an ~80-MHz lowered frequency range for Gbps C-band thus has lost its practical immediacy.

Since the previous TOG, we've encountered an increased incidence of unusual pack-shipping incidents, both in receiving packs at JIVE and sending them out to the stations. Hans can mention a few particulars. More unusual problems receiving disk-packs arose in session 3/2011 from VERA_Mizusawa and VLBA stations; in each case the packs were returned to the senders at least once. For VERA_Mizusawa, this was for the last two epochs of ER026 -- eventually the data were e-shipped (they divided the data into 10-second segments and made those available to ftp) and we reconstituted packs at JIVE. For the VLBA's, some of the packs had been recycled before we noticed the problem (3 stations entirely lost, 3 partially lost, 4 unaffected).

Stations are also reminded to check various web pages periodically, and let us know if information has changed:

EVN contact page: www.evlbi.org/contact/

ToO contact page: www.evlbi.org/proposals/ToOtbl.html

EVN status table: www.evlbi.org/user_guide/EVNstatus.txt

especially available bands, frequency ranges, frequency agility

The two sched catalogues that seem to require updates the most often are:

(i) freq.dat, containing station-specific information about frequency ranges, LO's, and IF names for various bands; and (ii) stations.dat, containing information about antenna slew limits/speeds/accelerations and settling time. If you could review these (from the most recent sched version 10.1) and let us know about things to change, we can enter these into the system for uptake in subsequent sched versions.

USER SUPPORT

The EVN Archive continues to provide web access to the station feedback, standard plots, pipeline results, and FITS files. Access and public-release policy remain the same, with the addition that ToO's now receive only a 6-month proprietary period, reduced from the 1-year period for "normal" observations. We migrated to a new archive machine that currently has about 31 TB of (reasonably easily expandable) disk space -- having come within 100 GB of exhausting the ~13 TB space on the previous archive machine.

We continue to contact all PIs once the block schedule is made public, and to check over schedules posted to VLBEER prior to stations downloading them. This occupies a great deal of time in the fourth to second weeks before the start of the session, but helps to prevent avoidable errors in the observations themselves. This process has admittedly become complicated in the past couple sessions in light of the new digital back-ends that don't follow any existing patching rules known to sched (yet). We have been providing PIs with plug-in "setini" blocks and a separate stations.dat file to incorporate these improvements as transparently as possible from the PI's point of view. There have also been a larger number of observations having multiple versions of the schedule after the original was uploaded (or even after it was moved to .latest/). Sometimes this has happened as new stations get added to the experiment (the last 3 sessions have had block-schedule versions running to 4 or higher).

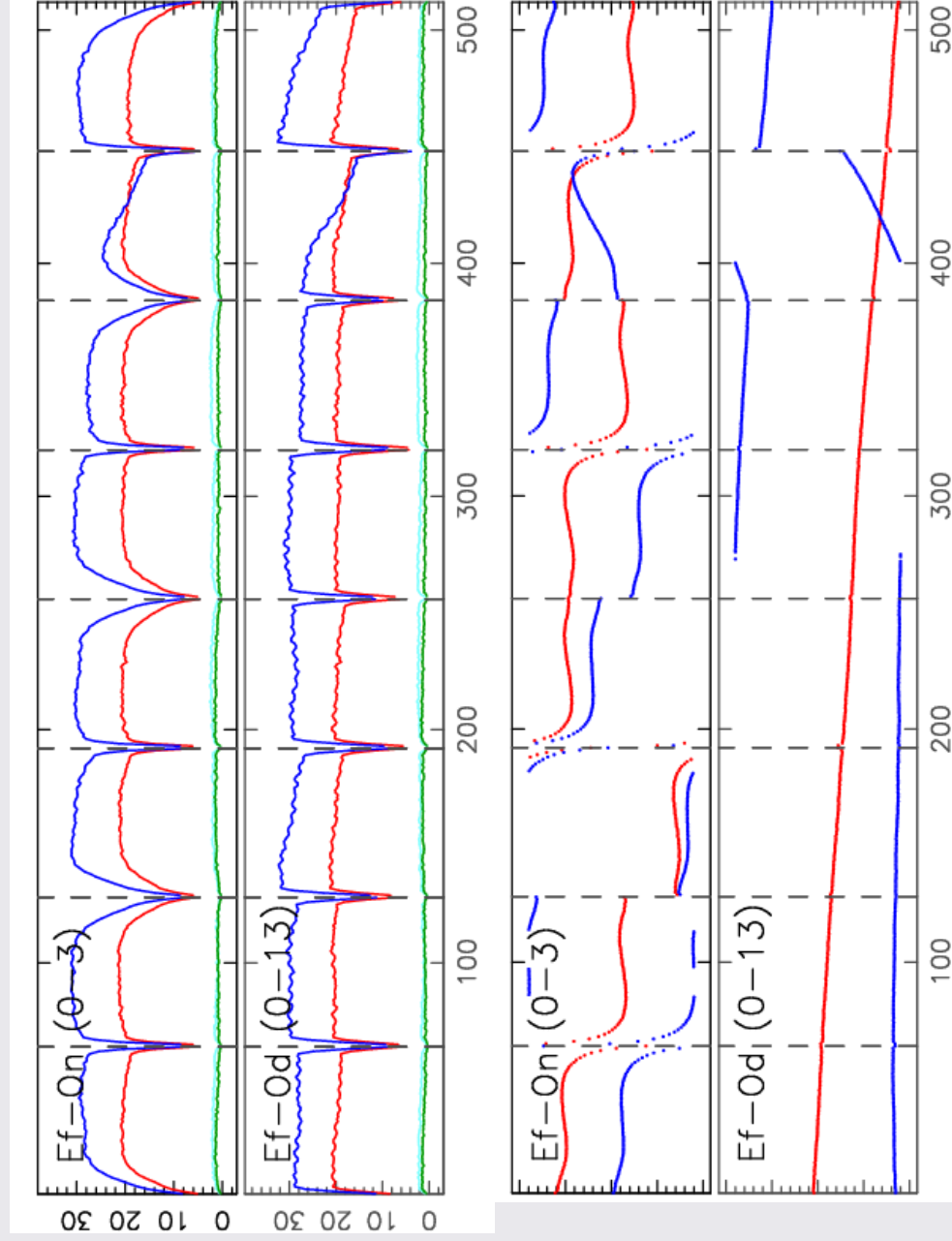
We are working to merge the EVN+MERLIN and e-EVN proposal categories in the EVN proposal tool into one, so that a single proposal can request both disk-based and e-EVN segments at the observations-details tab level. A test version of the tool does allow this, but we didn't make it active for the 1 June deadline because I was still concerned about how well observations-detail information from already-submitted proposals in one of the two "legacy" categories could be re-used straightforwardly in the observations-details in the new combined category. I have every expectation for this to be in place by the 1 October deadline.

- In session 1/2011, 3 stations recorded analog/digital backends in parallel, and the KVAZARs shifted over to their new digital back-ends.
- Effelsberg already using DBBC for EVN observations.

Onsala:

Mark4 (On)
&
DBBC (Od)

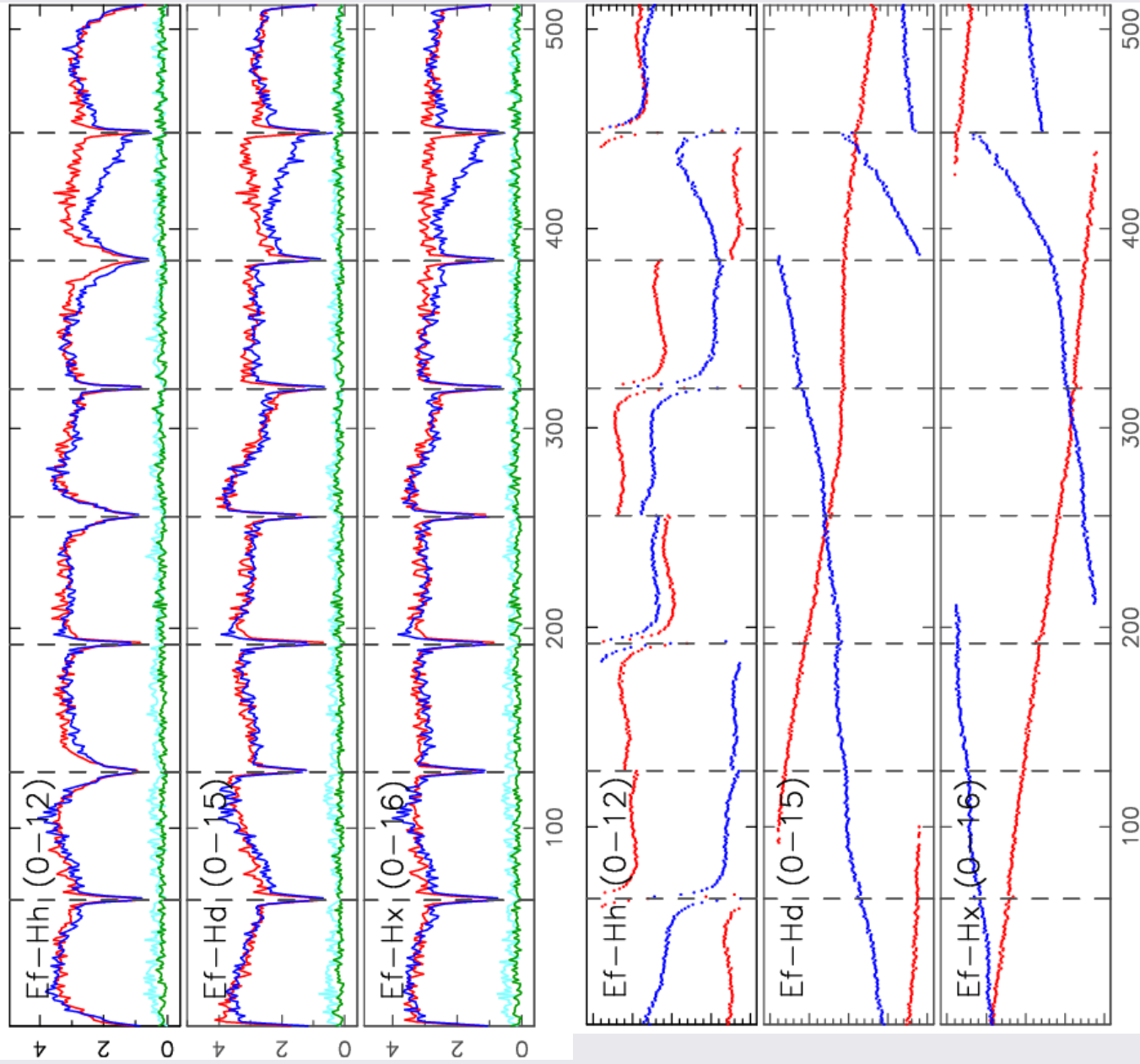
- » Amp(ω) more rectangular
- » $\varphi(\omega)$ linear across the bands; aligned apriori (no phase-cal tones used)



Hartebeesthoek:

Mark4 (Hh)
&
DBBC #1 (Hd)
&
DBBC #2 (Hx)

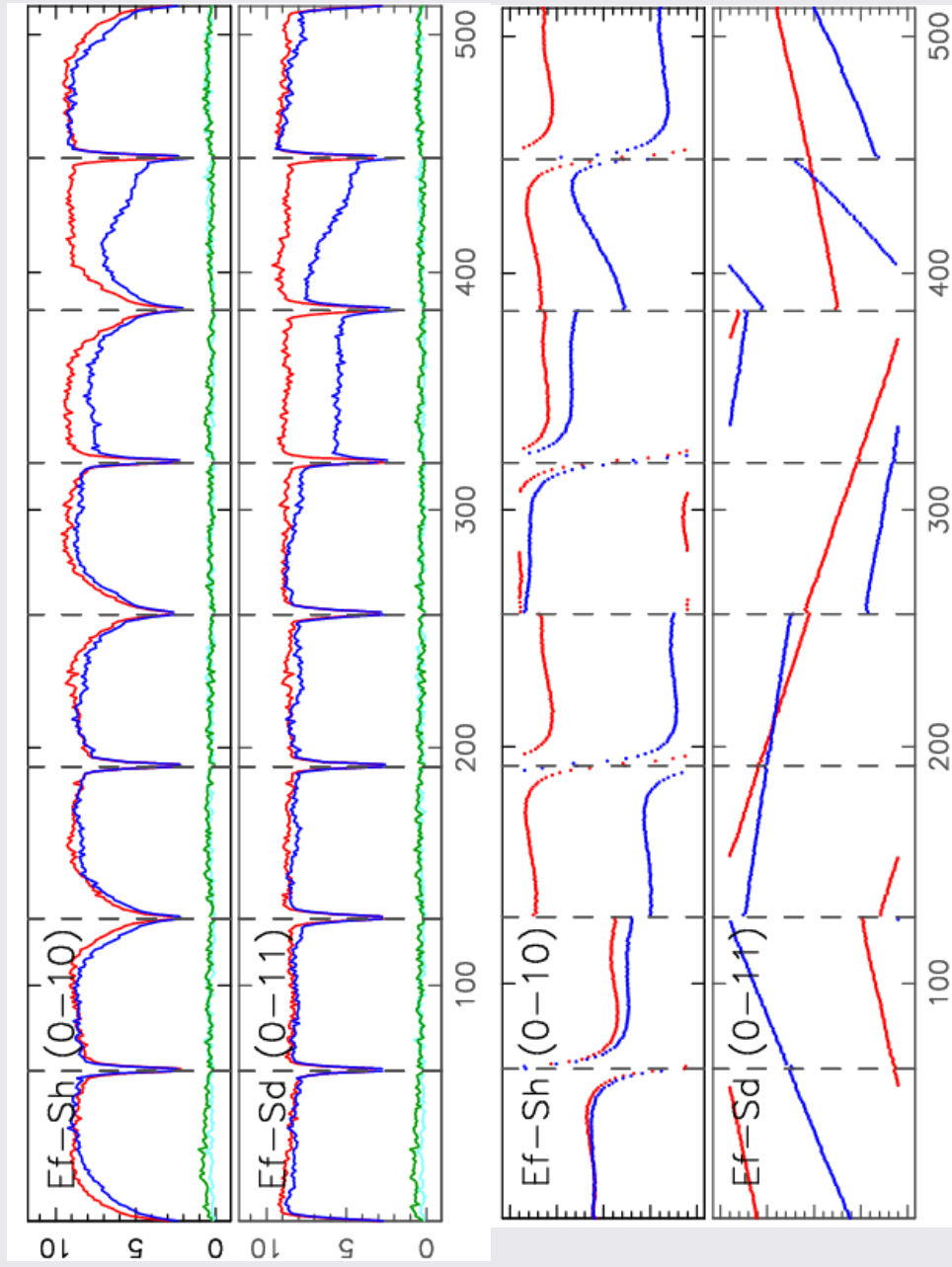
- » Amp(ω) more rectangular
- » $\varphi(\omega)$ linear across the bands; aligned apriori (no phase-cal tones used)



Shanghai:

VLBA4 (Sh)
&
CDAS (Sd)

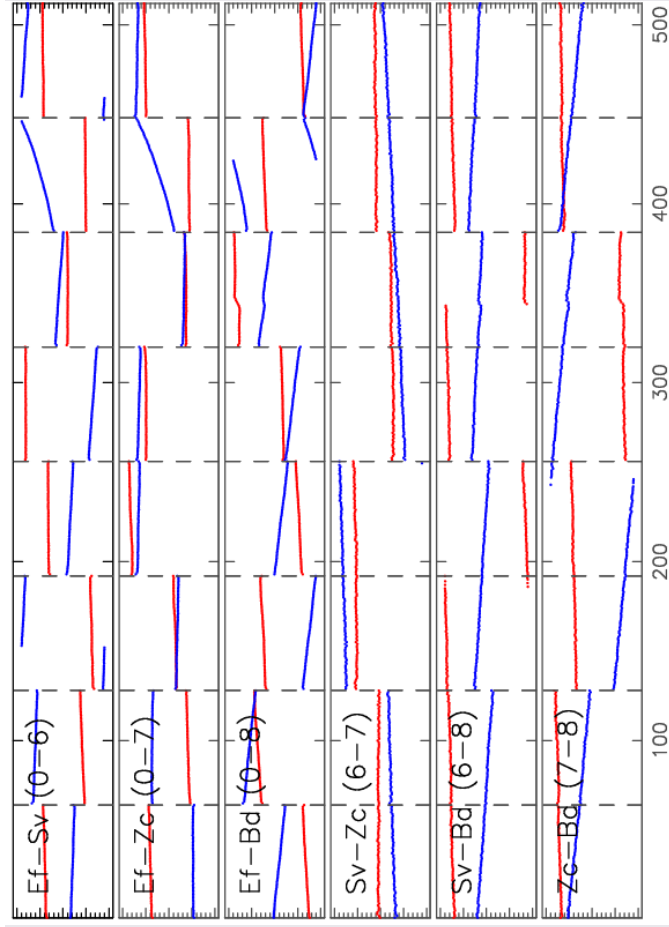
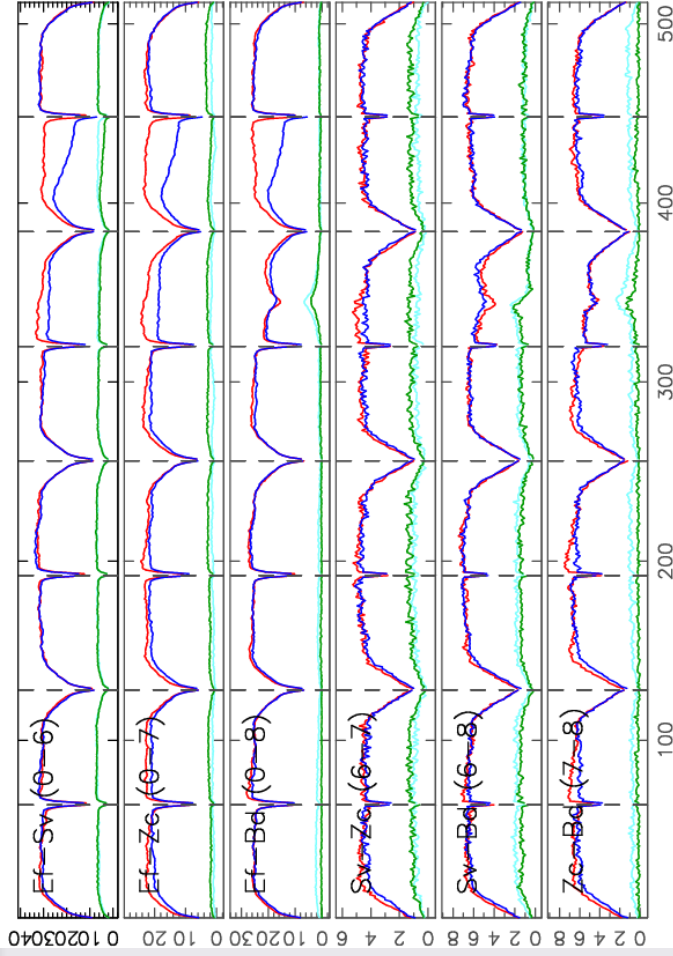
- » Amp(ω) more rectangular
- » $\varphi(\omega)$ linear & no LSB-USB offset within each BBC



KVAZARS:

R1002 (Sv,Zc,Bd)

- » Amp(ω) more rectangular
- » $\varphi(\omega)$ linear; R1002-R1002
baselines: no LSB-USB offset



Real for clk276

