

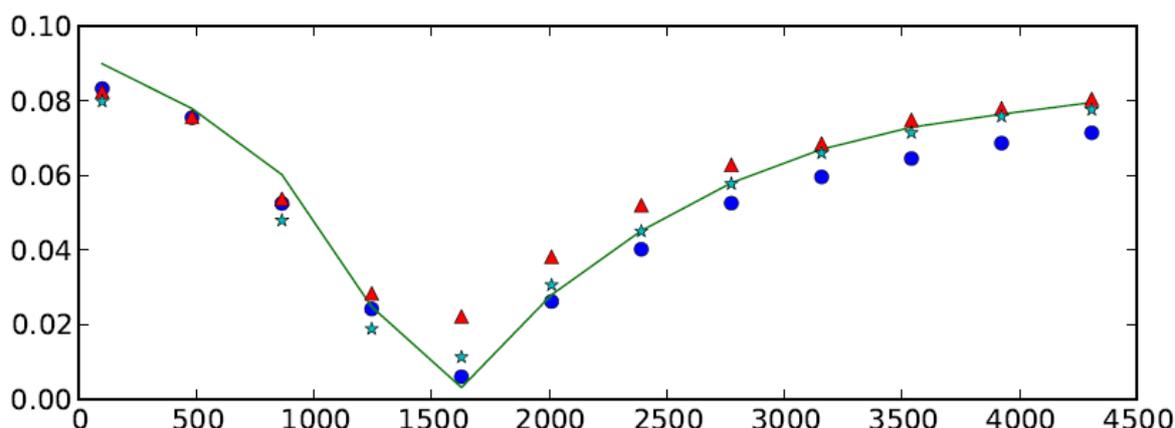
## SCIENCE IPT

### Commission and Science Verification

We decided to cut back on end-to-end testing this month and instead concentrated on technical issues, in particular the testing of software version R8.0. The latter is looking promising – certainly the enhanced features, such as the new shift-logging tool and scheduler, and the improved rates at which we can get data out of correlator are most welcome. The test campaign was however disrupted by problems in the underlying software infrastructure. As a result there is still quite a lot of testing and de-bugging to be done when work on this resumes in January.

Testing of the system on ~600m baselines was started and so far no unexpected problems have been found. We are trying to collect as much data as possible on atmospheric effects and on the validity of our phase correction techniques while the antennas are in this configuration – presently scheduled to last until late January. Because of limitations in the switch-gear it will probably not be possible to return to baselines as long as this until the permanent power system is in operation towards the end of 2011.

We are now pursuing polarization measurements seriously and the initial results are promising. Here is a plot of the combined “cross-hands” correlations (essentially Stokes' U in the antenna frame) on the quasar J1922 – 293, which is known to have a relatively high degree of linear polarization and passes close to the zenith at the ALMA site.



The horizontal scale is time in seconds, the different symbols represent different baselines and the green curve is a model for the expected behaviour due to the change in the parallactic angle as the source transits, assuming a source with 9% linear polarization. Clearly this looks good, but the same experiment also showed that on some baselines the cross-hands correlations are being mixed up. This is most probably a book-keeping problem and it is now being investigated.

On other technical topics there has been useful progress on many individual problems, but I am sorry to report that, despite a lot of effort, none of the more serious issues, such as the astigmatism in the dishes, the tuning failures and the timing-event errors, have been resolved.

In general the antenna availability has been good, with 9 antennas operational simultaneously for some periods at the end of the month. There were however some rather long outages on both DV08 and PM02 as a result of various equipment failures. We may need to start paying attention to a new parameter, which would be the time that it takes to get things fixed, and to whether this is set by the availability of the necessary people and/or spare components, or something else. The rate of significant faults was down to about 3 per night, which appears to be a definite improvement. (The statistics for this month are somewhat distorted by the fact that we were doing the R8.0 deployment for a good part of

this period and the numerous software problems that naturally occur at that stage are recorded in a separate system.)

We had a very useful visit from Masumi Shimojo, a solar radio astronomy expert from Nobeyama, who is going to start working with us on establishing the solar observing capabilities of ALMA. An outline plan to enable us to offer solar observing in the Cycle 1 call was drawn up but this is critically dependent on the delivery of the solar filters. At present there is no schedule for these Front End components.

As usual a significant amount of Science IPT effort went into support antenna testing at all three vendor sites, with the AEM holography work being the major new item and additional effort coming from NAOJ to participate in the holography and pointing tests of the 7 meter antennas.

Looking ahead, we are of course focussing on Science Verification and preparations for early Science. The biggest immediate concerns are the rate of delivery of completely equipped antennas, which is now looking critical again, and the availability of the power and fibre systems to the antenna stations in the central cluster.

### ASAC

The committee met by telecon. The main topic discussed was naturally the preparations for Early Science and the committee supported the proposed plans.

### Development

Work continues on this in the regions, including a discussion of the topic in the Japanese science advisory committee and preparations for the studies in Europe. At the JAO some further consideration was given to phasing-up ALMA for VLBI.

### Staffing

Doug Johnstone and Olja Panić completed their very useful “medium-length” tours as part of the Science Team, but we had no new visitors in December and no other staff changes took place.