

===== **CRT/Tianlai/BAORadio teleconf (28 February 2013) summary**=====
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Attendance: R. Ansari, J.E. Campagne, X. Chen, J.M. Martin, M. Moniez, C. Magneville,
J.Peterson, F. Quan, P.Timbie, A.S Torrento, Jiao Zhang, Le Zhang

A- Tianlai tests report (X. Chen, Feng Quan)

Tests performed using 3 D=5 m dishes, equipped with feeds, LNA and receiver at the

Optical observatory site Xinglong. Convenient site for testing, located near Beijing, but

with large RFI due to cell phone towers.

(see details on the Tianlai wiki :

http://tianlai.bao.ac.cn/wiki/index.php/Main_Page

(account: *21cm* and *hydrogen* as password)

- problems with the institute of automation digital system : overheating and sampling frequency inadequate for the institute 54 receiver system.
- LNA and receiver of institute 54 OK - additional filters had to be put in to cut cell phone signal
- Support of one the antenna had been broken by the strong wind, but the two others can be used
- Modification and enhancement foreseen by institute 54:
 - change of bandpass filter to match sampling frequency
 - Adjustable frequency range
 - RF filter as a replaceable part
- Report by Feng Quan on observations - see details and figures on Tianlai wiki:
http://tianlai.bao.ac.cn/wiki/index.php/Two_dishes_interferometer_in_Jan_2013

- Filter/LNA -> Jeff receiver (filter + LO) -> digitization and visibility computation on FPGA board made by institute of automation

- Visibility sampling time 0.5-1 s , transfer to PC/laptop through USB

- Observation on CasA - fringes observed, check fringe rate / oscillation frequency (two different oscillation pattern visible) - dish distance $d \sim 30$ m

- some data transfer problems during sun observations. It is suggested to have a packet protocol. R.A. will send some information on the packet protocol used in BAORadio

B- Tianlai status report & site selection (X. Chen)

- Tianlai project annual review carried early february
 - Project received high mark
 - Informal discussion indicate that it is better to avoid changing the technical design from cylinders to dishes
 - However, there is a budget to build a 16 dish system
 - We might end up having two parallel programs, dish and cylinder, which will enable us to compare the two options

- Site selection:

After considering various factors (the RFI, the logistics, and the source of support), we decide to select a site near Ulastai in Xinjiang, either in the 21CMA site or in Dashankou (about 25km west). Xuelei will travel in mid-or-late March to Xinjiang to talk about land issue, and hopefully could start the construction this year.

C- Wide band observations, noise and sensitivity (J.E. campagne, A.S. Torrento)

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Presentation by J.E. Campagne and A.S. Torrento on HICluster (NRT observations), PAON

(dish test interferometer), and tests in the lab - see slides.

- PAON-2: 2 x D=3 m dish interferometer at Nançay, installed in september. Routine observations - fringes observed for example on CygA - $T_{\text{sys}} / \eta \sim 200 \text{ K}$, compatible with expectations ($\eta \sim 0.6$)
- HICluster program - Abell 85, Abell 1205, Abell 2440 observations (total $\sim 30 \text{ h}$ over more than a year) - the expected sensitivity $\sim 1 \text{ mJy}$ achieved, but structures in the spectra
- Intensive tests in the lab: effect due to cables
- Different sources of structures in the spectra, mostly due to standing waves in the cables or between the mirror and the receiver in the case of NRT ($\sim 500 \text{ kHz}$)
- J. Peterson suggest that the SWR (standing wave ratio) could be decreased by inserting attenuators or with sophisticated RF engineering (better impedance matching)
- Having long cables $> 50 \text{ m}$ should be avoided in order to keep spectra structures with scale large compared to $\sim 1 \text{ MHz}$ 21 cm structuring. Having digitizers close to the LNA might be a solution. P. Timbie warns about having digital electronic too close to the LNA and the antenna. The idea is to keep the cable length $< \sim 5\text{-}10 \text{ m}$ (10-20 MHz structures in the spectra)

D- Tianlai Design Report

- P. Timbie has setup a collaborative latex site (writelatex.com this is a free service)

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check the web site :

<https://www.writelatex.com/80272tncnk>

The aim would be to make progress on TDR writing for the collaboration meeting end of spring/ early summer

E- Collaboration meeting

- It is suggested to have a combined open science meeting (~ 2 days) and the collaboration meeting, end of june or in july in NAOC (Beijing)
- The date should be fixed by the next teleconf - find the best date using polls (doodle ...)

AOB

- We skip the march meeting, and we got back on track by having our next teleconf on thursday, 11th April 2013- Next meeting: **11 April 2013**
- bao21cm mailing list : Reza can update the list on the list server at FNAL - This list should be the list of scientists working on the project.

Suggested membership (need additional names on the NAOC side)

Jeff Peterson <jbp@cmu.edu>,

Peter Timbie <ptimbie@wisc.edu>,
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