Tianlai Dish array next papers plan

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- Paper I : Tianlai dish array NCP & mid-latitude low-z surveys forecast

- Paper II : Map making with Tianlai dish array

- Paper III : Intensity Mapping with dish arrays : impact of instrument and calibration imperfections

Paper I : Tianlai dish array NCP and mid-latitude low-z surveys

See also Sep. 2020 slides :
https://indico.fnal.gov/event/45427/contributions/197313/attachments/134488/166494/TNCCS_paper_plan.pdf

- Concentrate on forecasts for dish arrays survey of NCP and at mi-latitude at low z ($z \lesssim 0.1$) , 1300-1400 MHz - Keep the detailed discussion of impact of various instrument & calibration imperfections to Paper III
- Determine the frequency range : 1330 - 1430 MHz ?
- Science targets : nearby HI clumps (NCP & mid-latitude) , cross-correlation with SDSS galaxies (mid-latitude) , cross-correlation with NCP galaxies (WYIN spectroscopy)
- Is there anything to be done with high-k mode analysis of visibilities at this level ?

Paper I plan- updated from Sep 2020
Part I

1. Introduction
2. Low redshift surveys : a path to prove Intensity mapping and transit observations - discuss the way instrument noise project on sky (varying with resdhift, as well as the accessible k (wave-number range) - The ~~three~~ two signals : nearby HI clumps and SDSS x HI cross-correlation
3. From instrument noise to visibilities and maps (1300-1400 MHz)
   - Per pixel noise level (visibility space and map space)
   - The simple foreground subtraction methods used
   - Average power spectrum C(l) , or P(k) , with and without noise, before and after foreground subtraction
   - *Impact of imperfect calibration - just one or two examples, such as phase-cal errors*

Paper I plan- updated from Sep 2020
Part II

4. HI clump detection : effective detection thresholds in Jy, (based on simulation including foregrounds and radio-sources , followed by map-making ,~~ or in visibility space~~) , Use mass distribution (from ALFALFA) and get the number of detectable sources for the NCP & mid-latitude case

5. Cross correlation signal detection :

   - SDSS data description
   - HI signal modeling
   - Cross-correlation signal computation
   - Discussion of some additional effects : Incomplete spectroscopic catalogs , and redshift errors
   - What about the NCP case & WYIN spectroscopic survey ?

6. Discussion / Optimal strategy : NCP area coverage and redshift ranges, mi-latitude coverage and redshift ranges

   - Anything about the high-k mode analysis using the NCP simulated visibilities ?

Comments - suggestion
(exact copy of Sep 2020 slides)

- Consider cross-correlation with ALFALFA or FAST HI survey → survey at low latitude to have overlap with theses surveys (Peter)
- There are frequency bands unusable due to strong RFI (from satellites) , around 1380 MHz for example - We should blank these frequency bands which will decrease the statistical significance (Olivier)
- For section 3, evaluate the impact of going from analytical smooth beams to realistic beams from simulations - Peter hopes to have the computed beams soon
- Check whether the stripes observed by SDSS at the highest declinations (~80 deg) could be a target area (Albert)
- Start an overleaf document (Peter)

Paper II & Paper III

- Paper II :
  - check the phase calibration for the NCP data, we can then make maps, BFM works on night-data only
  - Carry a mid-latitude survey over 10-15 deg @ 700-800 MHz wide in declination : we should be able to see many bright radio sources in the maps, and we cam test foreground subtraction by studying the residual maps
- Paper III :
  - Thanks for the beam files , we have run some test cases using the CST computed beams, analysis under way : results at the collaboration meeting
  - Started also to compare different array configuration and we need to study the effect of imperfections : imperfect beam knowledge, imperfect phase and gain calibration, but also the band-pass knowledge

the iRODS service at CC-IN2P3 could be used for larger data exchanges