From: **Wagg, Jeff** J.Wagg@skatelescope.org
Subject: PoS(AASKA14)012
Date: 12 November 2014 14:29
To: Pritchard, Jonathon j.pritchard@imperial.ac.uk
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Dear AASKA14 Author,

Attached you will find the scientific and editorial reviews of your AASKA14 paper, as well as instructions for re-submission.

The scientific reviews were undertaken by outside experts while editorial reviews were undertaken by the SKA science team.

Please read the attached Instructions to Authors carefully, noting in particular:

Revised papers should be submitted by NOV 31. Papers that do not seriously address the reviews will be returned to the authors.

Revised papers are to be uploaded directly to PoS, ensuring you submit both the pdf and associated files (latex manuscript, figures, bibtex, …).

Once the revised versions have been submitted and final copy-editing undertaken, authors will be notified that their chapters have been formally "accepted" and can be posted to astro-ph. We anticipate this will be completed by the end of the year.

regards
The SOC

Scientific and editorial review:

Abstract

~~Maybe make clear from the start that HERA is a planned instrument, whereas PAPER/MWA/LOFAR are existing SKA precursors/pathfinders. SKA ofcourse is also a planned instrument.~~

~~"z=6-30" In the rest of the chapter "6-27" is used. Please ensure consistency.~~

Section 1:

~~"established the basic picture of the Universe". Maybe clarify that it is a working model but that we still do not really understand most of the material/energy components on the Universe. Deviations from the standard model could help to enlighten new physics.~~

When mentioning cosmological constant or dark energy evolution, maybe also mention that we still assume that the (FRW) metric of the Universe is that of the average energy-density

components and that the average metric of a clumpy universe might not be the same of the metric of the averaged Universe (i.e. most of the volume of the Universe is under-dense and behaves like an accelerating Universe). I think the debate is still open on this but it's not clear whether this will not have an effect on our understanding of the equation of state. Maybe comment shortly on this?

~~"certain amount of cleverness". Maybe rephrase a little?~~

Section 2:

~~In table 1, it seems the sensitivity of SKA1-low might be too low: 899 * 256 * 3.2 m^2 at the critical frequency of the dipole is 0.736 km^2, not 0.306 km^2. Please clarify how you come to this number or is this only the core area, which has half the number of stations (911-45 /2 = 433)? If this number was used, are the sensitivities in the chapter too low (PS sensitivity scales with 1/Acoll^2).~~ This was an error in the Table and not in the calculations.

~~(bottom of page 3) "x_H=1" -> x_{HI} =1" ?~~

~~Some of the sensitivity plots here are also in Mellema et al. (2013) including discussion. Maybe add a reference?~~

"By z = 20 the amplitude … too small …". Is this really correct? The assumption in table 1 is based (possibly) on a too low Aeff. Note also that in a three-tiered survey there can be up to 5, 50 or 500 fields of depth 1000, 100 and 10hr respectively that substantially increase the sensitivity on smaller scales as well, which are currently dominated by sample variance. Could you comment on this?

It is not clear how one gets to the numbers on Table 2. Could you please explain a few sentences how these have been derived or provide a reference to a publication where it is described?

~~End of section 2 "from EoR observations" -> "from CD and EoR observations"~~

Section 3:

~~Please expand Fig. 3. It's currently too small to read the labels.~~ Need to remake this with Larger captions!

Maybe comment on how we could ever be able to remove effects of heating and the Ly-alpha coupling. Are there smoking gun signatures that allow us to measure Tspin directly from other effects at these redshift (e.g. CO/CII, etc.) that could then be used to determine the Tspin field? Maybe add a comment on this?

Section 4:

~~First paragraph: Maybe mention bulk flow effects as a possible effect during the periond of IGM heating as well that could have major impact.~~ I made this more explicit in the bulk flow section 5

~~"can tells us" -> "can tell us"~~

~~"such an a lower" -> rephrase sentence a little?~~

~~(Sitwell et al. 2014) Missing punctuation.~~

~~"Driven by the evolution of M. structures …" What is M. ? It's not clear. Please clarify.~~

Section 4.1:

~~Please expand acronym in the section title. It's defined only in the next sentence.~~

~~"The Planck … places limits …" -> "The Planck placed limits …"~~

~~Define n_b on page 9~~

~~"through the ambipolar …" -> "through ambipolar"~~

~~In fig. 5 could you add a simple relation between k-mode and l-mode? Also what bandwidth is assumed in the noise curve calculations for SKA1 and SKA2?~~

Section 6:

How many 5-Gpc modes fit in the entire visible universe? Will sample variance remain an issue as it is in the CMB on the largest scales? Please comment shortly.

~~Last paragraph:"2.3 … comoving Gpc at z~5.5" The last parts seems a left over of change in the sentence, or do you mean "z~27" ? Please clarify.~~

Section 7:

~~"SKA plan" -> " SKA baselines design" ?~~

~~Also here, maybe mention the three-tiered survey approach of CD/EoR having 100, 1000, 10000 sqd of depth 1000, 100, 10hr on 5, 50, 500 fields, respectively. Not only focus on a single ~20 sqd FoV which is a single beam of 1000 hrs. Could Fig. 8 be made using the above survey specs?~~ Alluded to possibility of more optimised survey, but doesn't help a huge deal for SKA1-LOW.

~~"reconstruction noise", remove "noise" ?~~

~~Eqn. 7.1: (2 pi)^3 Is that factor correct or should it be squared given that it's a 2D power-spectrum.~~ Yes, that's correct. Comes from projecting 3D to 2D.

~~"with different j independent, …" Rephrase?~~ I think this actually is the clearest way to phrase this

"A_coll ~ 0.3 km^2". See comment above. This seems rather small for SKA1-low.

Section 8:

~~"limited by the relatively small sky". See comment above on three-tiered survey. Would that still be the case of such a three-tiered approach? Please comment.~~

still be the case of such a three-tiered approach? Please comment.

Comment added.

In a number of places you mention SKA or SKA-LOW
when it would be best to specify 'SKA2' or 'SKA2-LOW' if that is what you mean.