HECTOR SCIENCE MEETING

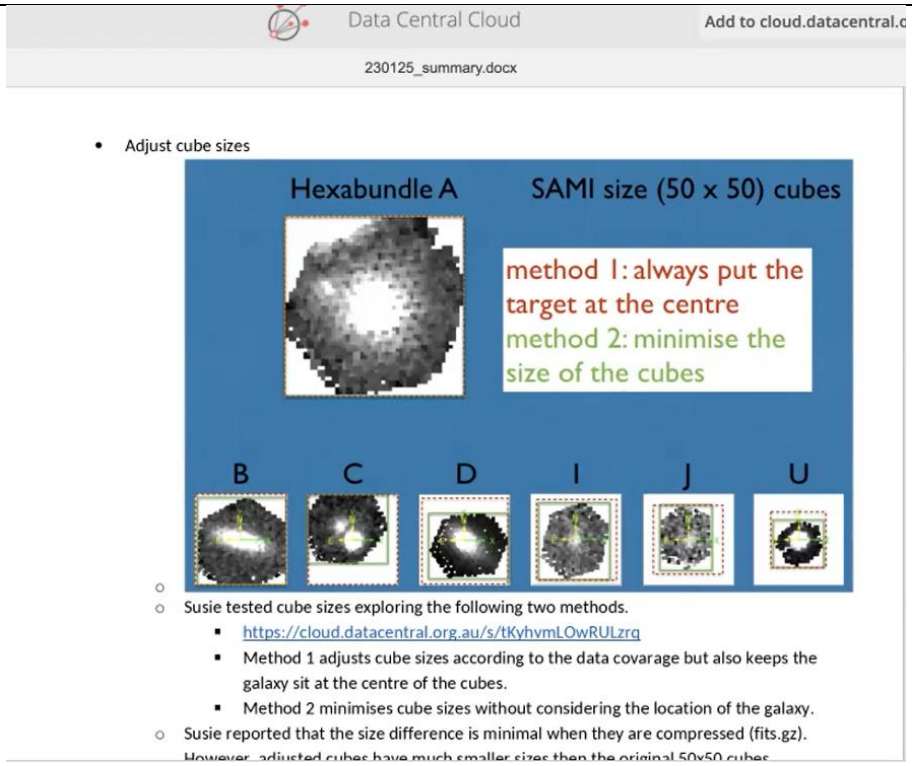
TUESDAY 14 FEBRUARY 2023, 3.00 – 4.00PM

Zoom – the meeting was recording for minute taking purposes only.

Attendees:, Sree Oh, Matt Owers, Stefania Barsanti, Scott Croom (Chair), Gabriella Quattropani, Mina Pak, Joon Hyeop Lee, Hyunjin Jeong, Jong Chul Lee, Amelia Fraser-McKelvie, Henry Zovaro, Marie Partridge, Sam Vaughan, Jiwon Chung, Madusha Gunawardhana, Kyuseok Oh, Tom Rutherford, Oguzhan Cakir, Jesse van de Sande, Angel Lopez-Sanchez, Susie Tuntipong

Apologies:, Luca Cortese, Julia Bryant

Item	
1	**Action Items from the previous meeting (9 November 2022)** • All members to consider potential PhD or masters students for the Hector Expert Observer role • Henry sent Sree a list of the bundles which showed anomalies (T&I) • Scott flagged a cross collaboration discussion for Hector/SAMI and WALLABY at the A3D Retreat but there was little opportunity to discuss this in detail. This is still in progress. • Sree and Madusha have added the cube rotation to the pipeline. • Julia and Matt discussed modifying the selection boundaries for the expanded RA regions in the H01 and H03 WAVES regions. This will be folded into the target selection. • Matt shared the sample plots he produced for Busy Week with Sam. The following items required Julia's comment: • Julia will email Luca regarding Hector tiling priorities higher in the overlap regions with WALLABY for things that will be more likely to be HI rich. • Julia will email Tayyaba to discuss freeing up a fewer night to focus on observations and not red shifts (TAIPAN).
2	**Data Reduction (DR) Update – Sree** • There have already been 2 meetings this year with the next on Tue 21 Feb • All members are encouraged to visit the DR webpage, review the tasks, get involved and join the DR meetings. There is a summary of the meetings on the Wiki. There are a number of small to medium DR tasks that require work. • Discussions and action following the last meeting: o Stefania will work on bad pixel masks. o Madusha is working on secondary flux calibrations. o Madusha and Sree will check with the SAMI transfer function. o Sree is working on improving the dome flats at the flap Cube Size Update - Susie o The Hector cube sizes have been expanded to 70 x 70 and one row at a time cut off the cube until the edge touches a spaxel (SAMI cube sizes were all 50 x 50 whereas Hector has different sizes due to the different size hexabundles) o ARB expander data cubing tool cuts off the edge of the cube row by row. As the blue and red cubes are produced, they are resized to be equal. This algorithm is included in the Hector pipeline and is working correctly. o Tom went through the examples Susie uploaded to Data Central and the centring of the galaxy is retained the wcs is also conserved. o The red dashed line are required to align the target galaxy to the centre of the field. o Although the hexabundles are different sizes they always have an even number of pixels at the edge. o Where there are 2 galaxies it is assumed that the more centred object is the target galaxy. Sree will look into a way to include the target magnitude as well. o The new cube sizes generated by Susie will be added to the data along with the new flux calibrations.



3	**Discussion of observers and schedule for this semester**
	• AAT schedules can be found here https://aat.anu.edu.au/schedules/AAT/2023A
	• There is no Hector observing until 17 – 30 April, followed by 13 – 26 June and 10 – 24 July.
	• The number of people required for each run needs to be established considering the agreement that the maximum nights for one person to observe should be 7 – 8 nights, especially as the nights will be very long.
	• Potential observers are keen to sign up in order to organise flights and schedules.
	• There is 2dF observing on the following dates (a total of 6.5 nights):
	  ○ 29 - 30 March, 13 -15 April, 12 May, 1st half night 23 May.
	  ○ Observers are yet to be assigned but aren't required on site. Allocations needed by next week
	
	Action Items:
	• Stefania will put out a request for observers this week (2dF today and Hector to follow)

4	**Target selection update – Sam –** Please refer to the accompanying slides Slide 1 – recap about target selection. The Hector target steps are shown by the blue line. Slide 2 – Overlap with ASKAP Surveys Slide 3 – Spectroscopic Redshift Completeness – Sam has been assessing how incomplete the input catalogues are. Sabine (ICRAR) has sent Sam the WAVES input photometry catalogue (WAVES Survey is on the 4MOST instrument on the VLT observing redshifts in the north and southern sky for the next 5 – 6 years). Slide 4 & 5 – Spectroscopic completeness - WAVES North field. Black boxes are G12 and G15 the completeness drops off as the magnitude increases. Outside of G12 and G15 there is approximately 70% completeness. Will this be an issue for the start of the survey until WAVES provides the redshifts required. Slide 6 &7 - Spectroscopic completeness – WAVES South field. The black boxes are G23, H1 and H3 which are not as complete. Average of 85% at R-mag 19 dropping off . There are patches in the corners with no redshifts. Slide 8, 9 & 10 – Cluster Regions (plots from Matt). The centres of the hector clusters and colour shows completeness,. The circles correspond to 1 R200 and 2 R200> the aim with Hector is to get up to 1 R200 Slide 11 - Summary – the next steps are to take the input catalogues and run them through the target selection and tile for the entire WAVES survey region. This is relatively quick to do and will be available at the next Science meeting The lack of completeness will have an impact on the survey with some areas needing to be reobserved. The best process is to work with WAVES and get red shifts as soon as possible before the start of the survey. Discussion: • Scott noted that 4MOST should be operational by 2024. They will also be operating combined stellar and other extra galactic surveys as well as WAVES. WAVES may therefore not get the completeness that had been anticipated. It should be confirmed that the Hector team will have access to the data , therefore MoUs need to be drawn up ahead of time. • Can the red shift survey with 2dF help? ○ Essential for the clusters but with 850 square degrees in each of the WAVES Nth and Sth regions, hence not using 2dF. At some point Hector will be observing areas which aren't fully complete with the input catalogue.

	○ WAVES catalogue is crossed matched with the redshift already in place to get an average completeness. The Hector limiting magnitude comes back to Slide 1.The plots haven't been Hector target selected . If the red curve 19.7 is pushed up it chops off a relatively small number of low mass galaxies. At 18.7 things are probably much more complete. The incompleteness is mainly the low mass galaxies below 10^9 ○ Completeness could be mapped on to the curve plot, this could be based on GAMA where there is complete data. It may be inefficient to observe some of the deep faint galaxies with 2dF. The plot could be done with G12 where the data is complete, limit that and rerun it to see how the purple points change. Matt and Scott will discuss options with Sam ○ Mechanism to run a mock survey. The only thing missing are the profound sky masks, but they are not needed as the sky fibres can be ignored. This may help guide the best way to improve the red shift completeness. Trying to be complete at brighter magnitudes as that is where most of the targets are, is the correct approach. • Originally it was planned to use TAIPAN data, Julia is looking into the options that are available to access the data, but this may not be available. • The cluster regions were originally selected from GR and Z imaging for all clusters. A new data release occurred at the end of 2022 with more exposures with detcam for G, R, I and Z. I band data is included for all the clusters now. Previously Matt was making a fake I band magnitude for G & R bands but this no longer required. The new data is currently being processed through propound. The Z band data looks to be a lot deeper for some of the clusters hopefully producing better results.
5	**Other Business** **Next busy week dates** • This is on the agenda to discuss at the Exec Meeting tomorrow (15 Feb). • A key item to fix is the flux calibration prior to the busy week, probably resolved in a month. • May would be a reasonable time
6	**Post Meeting Update from Julia (originally via email)** *Can I please encourage you all to sign up to tasks? If you want to use the science data then please do get involved because you (and everyone else) will get data to work with faster if more people put their hand up for tasks. Please email Sree about which tasks you want to take on.* *One task that is getting urgent is a test that needs to be done before Sam tiles the fields for April. That is to measure the ellipticity of stars from the blue to the red in several wavelength bands versus plate radius for all stars that have been observed so far in the star fields and as secondary standards. This is because we found in the runs at the end of last year when we started putting the guide bundles at the edge of the field plate that the psf becomes more elliptical at the edge of the plate than we expected from the predicted performance of the 2dF corrector. 2dF can't see this with single fibres, but resolving structures at the edge of the plate makes this obvious. We need to determine at what radius this effect is too large so that is put into the tiling software. Please consider if this is a task for you in the coming few weeks and let Sree know this week. It's not hard and you get experience in working with the data.* *I'm also confident that Sam has given you the update on the target selection and tiling plans for this semester.* *There has been discussion about the observers and the first important task there is for you all to answer Stefania's email about the 2dF observing. You will soon also get a request for the Hector observing, which starts in April.* *There was a question in the meeting about the new Hector expert observer hire: The job ad closes in a couple of days and interviews will be likely next week. I would like to be training that new hire in April.* *I'm currently at the AAT making several improvements to Hector:* *1. I was not happy with the optical quality of the quider. There was damage to the guider cables on some of the guides and this restricted how many guide bundles were usable. The guider optical cable and guide bundles have been rebuilt and are being installed in this trip.* *2. There is some work being done on the robot to refine the metrology and improve computer issues like licencing restrictions.* *3. I have brought up a custom jig to front-light individual fibres to check for swapped fibres based on the analysis that Henry has done of the existing data.* *4. Working with site staff on structures to store Hector on the telescope permanently to streamline the site staff process for the Hector instrument changes.* *5. ....and a few other Hector house keeping issues.*
	The next Hector Science meeting is scheduled for Wednesday 8 March 2023, 3 - 4pm AEST **Meetings will continue alternately on the 2nd Tue and Wed of each month at 3 - 4pm AEST (1 – 2pm AWST).**