HECTOR SCIENCE MEETING

WEDNESDAY 10 MAY 2023, 3.00 – 4.00PM

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

Attendees: Julia Bryant (Chair), Matt Owers, Sree Oh, Gabriella Quattropani, Marie Partridge, Jiwon Chung, Madusha Gunawardhana, Oguzhan Cakir, Jesse van de Sande, Sam Vaughan, Mina Pak, Tom Rutherford, Henry Zovaro, Brent Groves, Stefania Barsanti, Di Wang.

Apologies: Angel Lopez-Sanchez, Scott Croom, Joon Hyeop Lee

Item	
1	**Action Items from the previous meeting (11 April 2023)** **Observation Proposals** • Julia submitted the observing proposals with input from relevant member and emailed a copy to the group. **Data Reduction (DR) Update** • Madusha will give an update about her work on the DR pipeline – see agenda item 4. **Target Selection Working Group (TSWG) Update (Sam)** • Sam will discuss the breakdown of galaxies within R200 and those galaxies from 1 – 2 R200 and break down the stellar mass and radial distribution.in agenda item 3.
2	**Busy Week and Observation Update** • Julia encouraged everyone to register for the Busy Week ASAP and encourage those that don't currently come to meetings to sign up. • Working Group (WG) leads are encouraged to sign up and give a talk. • Discussion points that were raised at the last meeting have been flagged for discussion at the Busy Week. • None of the WG leads have submitted a talk at the ASA. Julia will be giving an overview talk, if time permits, she will ask the WG leads for a slide to present. • Conditions were excellent for the last Hector observing run where 228 galaxies (12 tiles and 7 dithers completed) were observed. This is sufficient to focus on the science goals at Busy Week. Madusha and Sree are currently working on reducing the data. • Data products will be discussed at the Busy Week. Emission line and stellar kinematics pipeline tasks will be allocated. • The new guider was commissioned and accurately centring of objects. • There were issues with Spector's red camera which affected about 50% of the observing time in the 2nd week of the last run. This is causing a major issue, preventing the data from the ccd from being used. This is a manufacturing issue with the camera which is still under warranty. The problem is similar to the early issues with ccd4 which required the camera being returned to the US. The issue is not constant, so it may be possible that a remote reset can be done. Some of the data is useable, plus the data from the first week. It seemed to be triggered by higher count on the detector, the object exposures looked fine, but when a calibration was taken eg a dome flat, the issues appear, so the data is available, but the calibrations are not usable. • Data from the blue camera has not been affected so can be used for stellar kinematics. • The last day of the run, Spector was also out of focus, so the data is not usable. • Hexabundle N is still missing. • Tom Woodrow the new expert observers started at the beginning of the last run and will complete the first week of every run.
3	**Target Selection Working Group (TSWG) Update (Sam)** – see attached slides. • Slide 1 - Observing summary (Hector and 2dF). • Slide 2 Matt has added some extra galaxies which dropped below a signal to noise ratio in a single exposure and were placed back in the pool for reobserving. There are an extra 200 – 300 red shift galaxies gained for free by combining repeat observations (not necessarily Hector targets). • Slide 3 - Cut outs in the first run. Selected top blue emission line images. Roughly an arc minute across. Sam plans to put the hexabundle outline on each cut out. The hexabundle allocation code will be discussed at Busy Week. There is a script to swap hexabundles at the telescope. • Slide 4 – Stellar Kinematics/non emission line galaxies. • Slide 5 - Target selection – sparsely sampling galaxies from the cluster red sequence. Select 50% of the red galaxies and keeping all of the blue galaxies. • Slide 6 – Fraction of Red Sequence Galaxies as a function of Stellar Mass -The colours correspond to a different cluster red sequence members are plotted at one and otherwise it is plotted at 0. The black line is the overall fraction of red sequence galaxies at a given stellar mass combined across all clusters. The thin lines show the same line for each individual clusters. • Slide 7 - Fraction of Red Sequence Galaxies as a function of cluster centric radius. Red galaxies are within 1R200 so fairly low observing priorities. Hector priorities are between 1 and 2 R200 and as you go out in cluster centric radius galaxies get bluer.

	• Slide 8 – Data Summary. Note that the numbers are not finalised yet and the bottom 2 clusters have a very high halo mass, but they are interacting which is likely to be inflating their velocity dispersions and increasing their halo masses. Choosing everything in the cluster catalogue and selecting 50% of those in the red sequence (not 50% of each cluster). Stellar mass is all galaxies in the cluster. All clusters except 1 fall into a stellar mass of $10^{9.5}$ and above. A0119 is less than $10^{9.5}$. This represents a fair correlation of the number of blue galaxies that will be in the survey.
	<mark>Action Items:</mark> • Please let Sam know if you have any change requests for the hexabundle allocations.
4	**Data Reduction (DR) Update – Sree** • Sree will give a full update at Busy Week. Work is being focused on generating the cubes. There is an issue with the flux calibration coming from the chromatic variations in distortion (CVD) so the code is being modified. Sree is pre processing the data and once all the updates are done the cubes will be generated. The reduction pipeline not 100% stable and updates are still being made. • The data from ccd4 could be reduced using the flat fields for the 3 other ccds, this could be done at Busy Week, however this is much more time consuming. At least one set of cubes will be presented at the next DR WG meeting (w/c 15 May). A test cube has been generated and will be circulated to test prior to the Busy Week. This could be used to measure the stellar kinematics and emission line kinematics – there isn't a CVD corrected cube but there is a test cube for the dwarf galaxies. Sree will share this with Brent and Jesse. • Sree would like to suggest 2 tests: 1. Will deep observations be made or not. 2. Quality control have not been applied to date, so the QC target needs to be finalised for observing. • Ccd4 data can be reduced, but there is some doubt as to the quality of the data for use in tramline mapping. Sometimes the flat is not available due to the ccd issue. The pipeline can use the flat from a different field, but the tramline position may be different and the throughput is affected. Keeping the counts low on ccd4 seems to help. Using the wrong flat does not affect the tramlines but the throughput will change. The throughput from fibre to fibre and bundle to bundle across the flat will change when a field is reconfigured, however if the dome flats are not used for the calibration and other methods used then this will not affect it. If the data is only being used for the tramlines they won't be affected too much. Only a small number of frames re affected, the data is not lost but will take more time to reduce. • The guider values have not been finally calibrated by David Broderick. This requires calibration to by reducing the data on the spot and it can be measured from the stars in the field and scaled on the plot. David Broderick has partly integrated the guider to be in synch with the integration of the science camera forming an integrated image of the guide stars. It will be useful to see the psf shape at the time of a particular observation and also useful for the QC as this allows identification of galaxies that require reobservation (as was done with SAMI). **CVD Effects – Madusha** - see attached slides • Slide 1 – Has been presented to the group previously. • Slide 2 & 3 – Results taken from 2022 data. Stellar field showing the CVD effects mapped. Ideally the blue tails should be orientated to the centre of the plate, however this is not consistent. • Slide 4 & 5 – Using Cross Correlation to Model CVD effects. Looking at consecutive 15 minute data frames should enable the recovery of the variation in the centroid for the 2 frames taken back to back, however this is difficult due to the interpolation. • Slide 6 & 7 - Using data from the April run with the same code Frames 16, 17 and 18 (15 minute back to back frames for AAOmega) more correlation is seen. • Slide 8 - The same stellar field taken on different days (Frame 13) shows more correlation with all the bundles. This is currently the only field with Spector and AAOmega data (there is one stellar field missing). It should be possible to produce cubes for galaxies with bright centres using this method. The blue tails not pointing to the centre could be due to a fitting effect which can cause a curve in the tail that is not real eg Probes I and A. Also, it should be noted that the 2022 data was taken during terrible conditions so as a result the poor quality data is much more difficult to fit and in some cases there will be misalignments throughout the wavelength range as far as fitting across the plate is concerned. Fitting a model with data taken in good conditions can then be applied to data taken in poorer conditions, however you may not see this as the error are greater than the correction being applied. • Madusha is working towards a model but can use a method to get cubes from some of the brighter centres, stars from other fields could be added to this. <mark>Action Items:</mark> • Sree will share test cube of the dwarf galaxies with Brent and Jesse
5	**Environmental Working Group Update – Matt** • During Busy Week discussions need to take place as to what metrics are required from the non-cluster and cluster regions and identify people who might want to take on these tasks of environmental analyses. • Producing data products which are used by members of the Hector team has real returns in terms of being named on papers that use those products. • If individuals don't have experience, there are tools available that can be adapted to assist with this. • Stefania confirmed that she would be interested in working on tasks as she is already doing similar work for MAGPI and will discuss this with Matt. <mark>Action Items:</mark> • Ahead of the Busy Week please consider projects signing up for or nominating other people for projects. • Matt to email team about interest in working on data products even if they are not attending the Busy Week.

7	**Other Business** • There was no other business.
	The next Hector Science meeting is scheduled for Tue 13 June 2023, 3 - 4pm AEST **Meetings will continue alternately on the 2nd Tue and Wed of each month at 3 - 4pm AEST (1 – 2pm AWST).**