HECTOR SCIENCE MEETING

TUESDAY 11 APRIL 2023, 3.00 – 4.00PM

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

Attendees: Julia Bryant (Chair), Matt Owers, Gabriella Quattropani, Joon Hyeop Lee, Hyunjin Jeong, Amelia Fraser-McKelvie, Marie Partridge, Jiwon Chung, Madusha Gunawardhana, Oguzhan Cakir, Jesse van de Sande, Sam Vaughan, Mina Pak, Jong Chul Lee, Kyuseok Oh

Apologies:, , Angel Lopez-Sanchez, Sree Oh, Brent Groves, Pablo Corcho Caballero, Luca Cortese

Item	
1	**Action Items from the previous meeting (8 March 2023** **Observer Coordination** • Travel forms and accommodation at SSO needs to be booked in 2 weeks before by observers to assist site coordination. Future observers are asked to be mindful of this. **Data Reduction (DR) Update** • Contact Sree with interest to work on some of the new DR tasks – encourage people to join the DR group meetings. Sree contacted Henry about the update to the python package for testing to continue. **Tiling Update** • Sam circulated the slides and a document and circulated an invitation for a group meeting.
2	**Observation Proposals** • The shared time proposal is due on Friday (14 April) and the reserve time proposal was submitted the w/c 3 April. • The application is for 36 nights in the reserve proposal and the shared proposal applied for 14 nights which bring a total of 50 night per semester. • Some universities are pooling their nights. • Changes to the proposal were made to highlight the data that has been gathered since the previous proposal and also included plots showing the impact of repeats observations of low mass dwarf sample and resolving [OII] doublet to the edge of the bundle for a very low mass galaxy. ==**Action Items:**== • Julia will email relevant people for input into the observing proposals.
3	**Hector Instrument Update** • The new Hector guider has been installed following the optical component rebuild, as the optical quality of the original guider was poor. • A coupling issue prevented the guider being tested to allow remote images to be taken, however this will be done prior to the observing run on the 17 April.
4	**Hector Expert Observer Update** • Tom Woodrow starts on Mon 17 April and will observe and maintain the instrument and take over some DR tasks as he has a strong background in software and python. • He will be a good liaison point between the Hector Team and site staff. For example ensuring parts are ordered and any maintenance is more coordinated. • Once trained he will complete the first 7 nights of each Hector observing run, then trained Hector observers will take over for the 2nd week. • For the first year he will double up with a night assistant. For initial observing runs there will still be 3 people on site as some team members are still being trained. Once established it is planned to have Tom, plus one additional observer on site and 1 person observing remotely.
5	**Data Reduction (DR) Update – Madusha** • Madusha has not been able to coordinate an update with the work Sree has been doing. • Madusha has been working on the P&Q offsets to be sent to Julia and the optical model for Hector. • Chromatic Variations in Distortion (CVD) which means that the centroid of the star is varying as a function of wavelength, flux is being lost. The effect also varies depending on the location on the field plate. At the centre of the plate effects are minimal but they seem to increase the further from the centre of the plate.

Hector Optical Model:
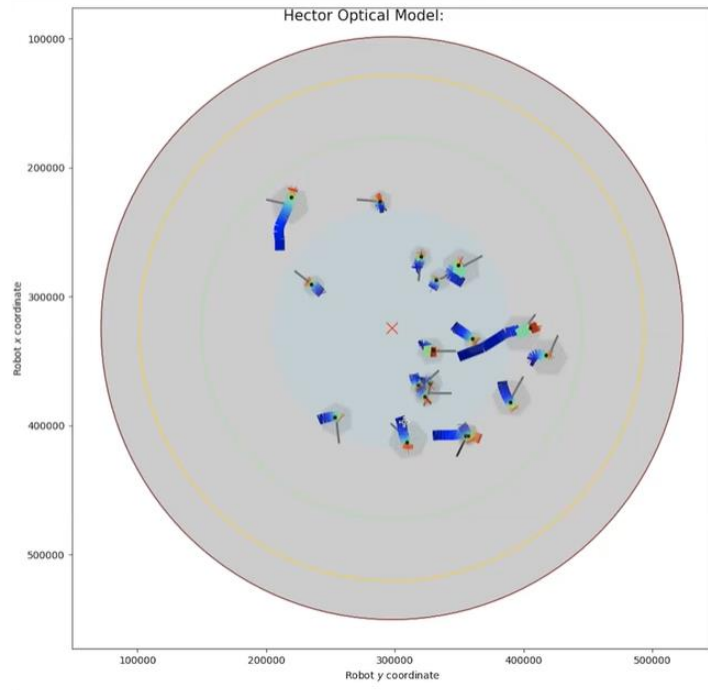
- The primary standards are shown on the plate (in an exaggerated view) showing how the centroid of a star varies as a function of wavelength. For the primary standard shown at the centre of the bottom of the plate, from the black point, the edge of the blue is one fibre core and so is equivalent to 100 microns.
- There are not that many primary standards to use toward the outer edges of the plates.
- However some of the effects are strange (see primary standard on the bottom right of the plate) as if you put the primary standard on the bundle the first time the effect is as expected however the 2nd time showed issues.
- Changes will be remodelled into the DR pipeline once further data has been collected during the upcoming observing run.
- Yifan has made a lot of progress on the PSF of the bundles and the details will be forwarded to Julia and Sam.
- Madusha is looking at the star field from the first half of 2022 however, this requires each frame to be looked individually as for star fields as well as the primary and secondary standard what is observed does not always match what is in the log so it will take some time to establish the mismatches.
- Sree has been working on the dome flats.
- Madusha was unable to review the DR action items as there were issues accessing the Data Central cloud.
- Matt commented that the large tails may be mostly from AAOmega and due to the impact of scattered light at the blue end, not due to an issue with Spector, as they mostly seem to be limited to the larger hexabundles.

==Action Items:==
- Madusha will recheck the data frames before removing them and updating the DR pipeline.

6	**Target Selection Working Group (TSWG) Update (Sam)**

Target Selection Working Group (TSWG) Update (Sam)
- There was a TSWG meeting held the week of 3 April with a plan to continue the meetings on a monthly basis.
- The discussion covered progress with impact catalogues, tiling and the impacts of including higher priorities for edge on wind galaxies, milky way analogues or low mass repeats.

Cluster Red Sequence Update – refer to attached slides.
- Cluster galaxies tend to be red and passive, so the goal has been only to subsample the red galaxies in the cluster as the more interesting science comes from the star forming galaxies.

Slide 1 – Fit red sequence and the blue cloud for cluster galaxies

Slide 2 – Plot of all possible cluster galaxies in the input catalogue. Black line – line of best fit cluster red sequence and the dotted lines being the 2sigma scatter. The colour points is the mixture model probability.

Slide 3 - Taking the bottom dashed line as the main dividing line, everything above it is called a red sequence galaxy and everything below it is a blue cloud galaxy

Slide 4 - Summary. The goal has been to repeat the observation of low mass galaxies and the DR group have reduced the data. Matt suggested repeating low mass galaxies along the line of sight towards the cluster as these would be easy to repeat and around 400 could be included in the observations without affecting the tiling efficiency, so these have been added into the catalogue.

Discussion points:
- The tiling priority bumps down red things (not blue) above R200. Will 1400 galaxies on the red sequence in the clusters be sufficient for the science people want to do eg kinematics.
- It would be good to understand the breakdown of number in terms of stellar mass and radial distribution to establish if retaining 50% of red sequence galaxies is sufficient.
- Also worth considering are how many galaxies are in each of the different halo masses. Sam has plotted halo masses previously so will check the information. Matt also supplied some information on halo masses to Sam some time ago.

Additional discussion points:
- Julia reminded everyone of the 3 initial science cases:

	1. Low mass dwarfs will not be the focus at the present time except for the repeats that will be done as part of the cluster observation. 2. Edge on winds. 3. Outskirts beyond 2R200 in clusters. • Cases 2 and 3 will be the focus this semester. • Stellar kinematics in low mass dwarfs will be a focus once more feedback has been gained. The signal to noise ratio is much better, but people are required to focus on the stellar kinematics data as this will inform if a revised plan may be required from the predicted data. Jesse confirmed that signal to noise ratio of about 5 should be sufficient for the science. There is a rapidly produced plot of signal to noise that was included in the proposal. The cube issues are almost resolved so people can start looking at the data. Repeat observations take a long time and will not be perfect in all cases. It was also noted that deep fields take a lot of time so significantly reduce the numbers in the survey – are the science gains worth the loss of time? ==Action Items:== • Sam will email Matt with the breakdown of galaxies within R200 and those galaxies from 1 – 2 R200. • Sam will break down the stellar mass and radial distribution and circulate the information and will also check halo mass data.
7	**Other Business** • Sam raised that Amelia has discussed the 4HS survey (4MOST) with Sabine Bellstedt. Red shifts may be available from Ned Taylor or Michelle Cluver this survey may fill out our survey catalogue before the WAVES survey. All of the WAVES/4MOST Surveys happen at once. • **Morphologies**. Kenji Bekki's PhD student (Mitchell) who studied deep morphologies may have time to work on this. His PhD was CNNs - deep learning neural networks applied to HSC imaging of SAMI survey with good results and could be applied to Hector data. The morphologies for SAMI were used in many papers. This would require a discussion with the WAVES team to get the imaging. It leads to improved morphologies as it follows a set of learned process rather than relying on the subjective views of different individuals. The data processing is already in place so it could be a quick project for him to complete in a short time frame. • **Stellar Populations** Miles modelling of stellar population science aren't good enough for Spector as this may degrade the data, however this may not have a major effect. There is another library which would be useful (which doesn't have any alpha over Fe values) for testing purposes to see if similar stellar population data result. • Impact on emission lines science may also be an issue. Doing the subtraction with non-stellar population models was an issue for SAMI where the full spaxel the Miles templates were smoothed to the total resolution after having the stellar kinematics, but this doesn't always work. There are a few options that could be tested. This would be a useful discussion for Busy Week. • ASA submission of abstracts deadline 17 April. Julia confirmed that she has applied to give an overview talk about Hector and to encourage others to do talks eg DR, some aspects may be too specific to Hector but highlight some great problem solving. Batch of talks about what the Hector team (particularly students) are intending to do with the data would be a good idea. Is there an opportunity to deliver online talks. Check the website www.asa2023.org.
	The next Hector Science meeting is scheduled for Wed 10 May 2023, 3 - 4pm AEST **Meetings will continue alternately on the 2nd Tue and Wed of each month at 3 - 4pm AEST (1 – 2pm AWST).**