Hector TS WG

Meeting 4 April 2023:-

Sree's science 50 galaxies in each low mass bin from 8-8.5 8.5-9 9-9.5 Must be in spector.

May 2024:-
Discussion with Stefania and Mina After they took over from Sam.
Points to note:
-The github for the Hector pipeline had no updates for the new robot params so what version is now being used, and there should only be one version.: Stefania folked Sam's github - the new "truth" in the Hector observation pipeline is SteBarsanti/Hector-Observations-Pipeline
But does the team know that? TS WG to inform the team.

-Check on selection points:

- Clusters sparse selection of red sequence but selecting all blue galaxies - are the priorities correctly set in the catalogue? Priority to first observe tiles for the clusters that overlap SAMI.
- How are we currently prioritising the early science + MANGA overlap objects? e.g. edge on disks, MANGA overlap, low mass stellar kins targets?
- See points from Busyweek
- There are only about 10 Hector-qualifying targets per field of 2dF targets. This is not efficient. We should implement colour cuts to improve 2dF efficiency in the H regions as we were doing in clusters. **ACTION**: Stefania (and Sam).
- Are we including foreground and background galaxies in the cluster fields? Particularly foreground dwarfs?

- Completeness, how are we placed for redshifts to select in the H01,H03 and cluster regions? When do we need to open up the next H0 region?: Note the discussion on opening up a new region in the Feb 2024 busyweek: We have about 2 years (2024-2025) of observing in the existing H01,H03 and clusters, but need 12 nights of 2dF ahead of opening up a new region and that will have to be in 2025 ahead of 2026 observations. We would target one of the regions in the South H0x area that already has 80% completeness and these 12 nights will fill the remaining 20%. We can instead cover the highest overdensity regions within those 80% complete regions because we can then come back to them after 2026 once WAVES starts to fill in the remaining z's, which will be biased towards blue and low stellar mass things. **ACTION:** Overplot the tile circles onto the plot that Sam showed in his talk of the redshift completeness in the South. Then we can evaluate the size of regions for which this approach may work and how much more Hector Survey time that would buy us before we need new z's. **ACTION:** TS WG to simulate tiling the overdense regions in South that are 80% complete. Matt had sent Sam the z's for the clusters that overlap the WAVES regions - overdense regions.
- **ACTION:** Determine what completeness in the redshift survey is actually required, by considering the distribution of targets that are covered in colour and stellar mass parameter space compared to a complete sample, then considering the impact on key science. Plots need to be presented in a Science meeting to address this question of completeness (which came from the Feb 2024 busyweek).
- We will have a lack of targets in ~June once A3667 and A3716 are completed in about a year. Therefore would have to ask for scheduling not around then. This needs to be predicted ahead by the TSWG to feed into proposals.
- Note: Getting completeness in the low mass galaxies for the hector input sample is essentially impossible outside of the GAMA regions because:-
  - -The GAMA regions get down to a depth sufficient to detect the low-mass galaxies, but we have no hope of achieving that depth in the Hector 2dF survey because it would take too long.
  - -In the GAMA G12,15,23 regions we will have a good complete sample of dwarfs.
  - -Elsewhere in the WAVES regions, we would need WAVES because 4HS does not get deep enough, but the timeframe for WAVES is such that the only way we could get completeness in our dwarfs selection is in the high density regions where we can observe the 80% of targets already in our catalogue and due to the multi-pass required in the high density regions we can then go back to those regions to complete the dwarfs and other "20%" galaxies once we have the WAVES catalogue.
  - -Hector will also have completeness in the foreground dwarf galaxies in the cluster regions.

- -There is nothing further we can do to get completeness in the regions outside of GAMA and the clusters, so we have to live with that.
- -In summary the Hector survey will have best completeness for the low mass galaxies in the GAMA and cluster regions and then possibly, if we plan carefully, we may have other high density regions that will have completeness in the dwarfs.

ACTION: Looking at the stats on the foreground cluster galaxies and number of dwarfs delivered.

2 August 2024:-
-revisit points above as many are ongoing actions.
Email from Stefania:

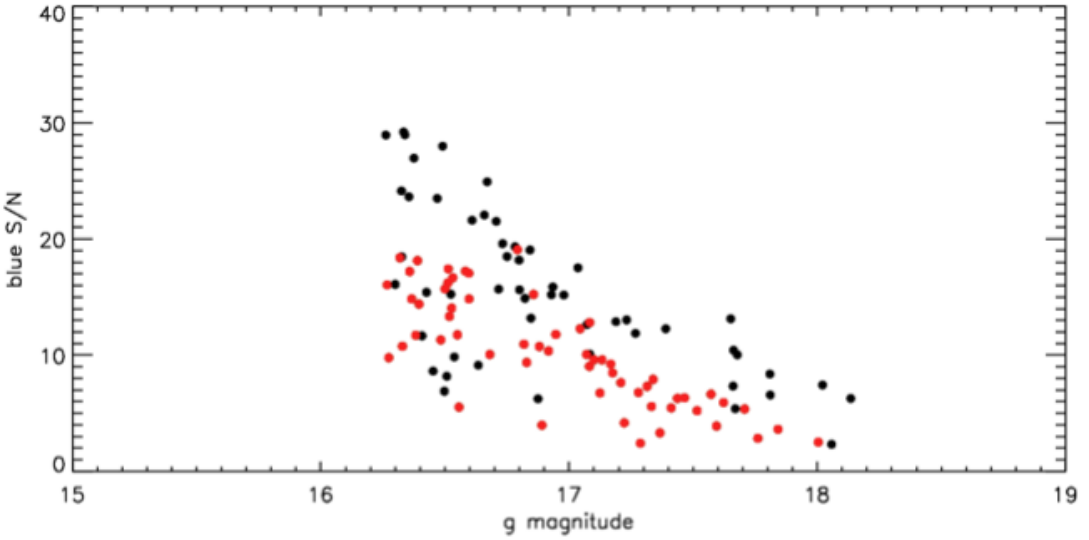
Hi Julia (cc Mina and Matt),

I wanted to let you know few final updates/issues for Hector tiling.

- *The hector database and input catalogue will be soon online at https://obslog.datacentral.org.au. I got a confirmation email from Simon. Once everything is set up, I'll let you know, circulating instructions.*
- *I got back from Sam regarding missing galaxies in the input catalogue but that have been observed and have datacubes. It seems that it is related to the random subsampling that we do during the catalogue creation stage, making sure it is repeatable. Sam ran this code last time before leaving, so probably something went wrong there. I'll have to dig more into the code to understand what is happening (Sam left me some tips), but it looks like all the information for these galaxies is in their original master catalogues (format *.parquet).*
- *G23 field. The segmentation maps for this field are missing in all uploaded directories. I double checked with Sam, since he definitely used to have them, but they are nowhere to be found. I asked them back again to Sabine and Luca, who produced them originally. Once they got back to us, there should be no issues for configuring G23 tiles.*
- *A85 field. There is a weird error (Mina also found the same error for some tiles of other fields, but I haven't double checked them yet) which is related to the hexabundle allocations. The tiles configure ok, but the observation pipeline brakes at the allocation stage. There are no issues when we create tiles for A85 with the interactive app (like we do for the SNAFU tiles), so it is totally observable and matchable to SAMI gals/regions, but I'll have to dig more into the tiling pipeline or the catalogues to understand the error.*

Disussion points for meeting with Stefania, Mina and Matt:
-brightening the magnitude limit for the secondary standards to <17 : Sree's email said
I examined the magnitudes of secondary standard stars that I visually identified as having unusual shapes in their spectra. They were all relatively faint stars: G12_T011(no mag info in the tile file), G12_T042 (17.4), A3667_T028(17.6), A3716_T015(18.1), H03_T093(18.0), A3667_T009(17.5).
Attached is a plot showing the g-band magnitude vs. S/N of secondary standard star spectra integrated over the whole bundle. Red symbols represent AAOmega secondary

stars, and black symbols represent Spector secondary stars. I do not expect accurate calibrations using spectra with S/N below 10. I highly recommend that we choose secondary standard stars with g < 17 magnitude to ensure better calibration accuracy.



But for SAMI we had the following:
Note this table is r-band, the plot above is g. F-stars are typically g-r~0.3-0.5

Table 9. Priorities for selection of standard stars based on the psf r-band magnitude and the colour values X, defined in equation (4). The higher priority value stars will be tiled first, and if none are available to match a field, then lower priorities are accepted by the tiling algorithm.

Priority	r_{psf}	X
8	$\leq$17.25	<0.08
7	$\leq$17.25	$0.08 \leq X < 0.16$
5	$17.25 < r_{psf} \leq 17.5$	<0.16
4	$17.5 < r_{psf} \leq 17.75$	<0.16
3	$\leq$17.25	$0.16 \leq X < 0.2$
2	$17.25 < r_{psf} \leq 17.5$	<0.2
1	$17.5 < r_{psf} \leq 17.75$	<0.2

ACTION: Simulate impact of changing standard star mag limits to brighter.

Input catalogue on cloud is parquet files - can't view directly on DC - download, load into excel or install viewer - hass. - Database nearly available on DC - see Stefania's email above. Useful to have text or csv file versions if it will take too long.