

LSST:UK Newsletter 15 (September 2021)

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Introduction

Visible signs of construction progress are coming thick and fast now. The pictures on the right show recent progress with the two cameras.

The upper picture shows the integration hall in the summit facility on Cerro Pachón, and captures the successful mounting of the commissioning camera, ComCam, into the Telescope Mount Assembly (TMA) integration structure. This is an important milestone on the route to integrating ComCam with the TMA itself, which is due to happen early next year.

Meanwhile, the lower picture shows the current state of play with the survey camera, LSSTCam. It marks the installation of the core of LSSTCam - including all 201 sensors, plus associated electronics, and the camera cryostat - into a test bench at SLAC.

One notable feature of both these photos is that they illustrate the successful integration of components from several sources - built within the Project and by external contractors.

On a less technically-challenging note, there is now a range of [Rubin Observatory swag](#) available for purchase online. Not only can you satisfy pretty much all your beverage receptacle needs in suitably logoed fashion, but the extensive clothing range even includes T-shirts for dogs!



Finally, this Newsletter is the first to include a postdoc job announcement. We have declined a number of requests over the years to advertise postdoc positions on the *lusc_announce* email list, because that was set up with the promise that it would be low-traffic, but inclusion in these monthly newsletters seems different, as it doesn't increase the number of emails sent out on that list. So, do consider advertising job openings

with *direct* relevance to LSST science through an announcement in a future newsletter. More generally, those with ideas for future newsletter items should contact the LSST:UK Project Managers (@ George Beckett and @ Terry Sloan lusc_pm@mlist.is.ed.ac.uk), while everyone is encouraged to subscribe to the [Rubin Observatory Digest](#) for more general news from the US observatory team.

@ Bob Mann

Rubin Users Committee

Rubin have released a call for members of the science community to serve on the Rubin Users Committee (UC). [The call in on the Community Forum, available here and nominations are due by October 15](#). Like similar committees for other large facilities, the UC will act as a formal interface for feedback from the science users to the Rubin project on data products and services, particularly the Rubin Science Platform.

The UC will solicit broad community feedback and meet twice a year, reporting to the Rubin Project Leadership. The UC will recommend improvements to maximize scientific productivity as well as equitable access and inclusive practices. UC members are appointed by the Rubin Science Advisory Committee (SAC) for an initial term of two years, with potential renewal up to 4 years.

All UC members must have Rubin data rights and the UC should represent the diversity of the community. The SAC recommended that the UC should contain at least one person from the UK. The LSST:UK Executive committee will be approaching some people to ask if they would consider being nominated. However we strongly encourage all LSST:UK data rights holders to consider either self nomination or nomination by a colleague. Self nominations are very welcome. The SAC will have to balance science area representation carefully and hence we would like to see a broad range of expertise in the UK nominations to provide a wide choice to the SAC and ensure someone from the UK does get selected.

Deadline : 15th October 2021

Instructions : [follow the instructions listed here](#).

@ Stephen Smartt

RubinTV

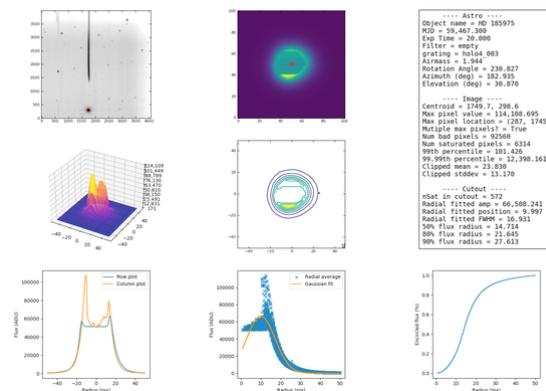
This month, I have mostly been working on... RubinTV. My latest pet project, RubinTV, was developed to provide real-time metrics for ongoing observations, to aid observers during their night's work.

<https://roundtable.lsst.codes/rubintv>

The landing page (which could do with being made a little more pretty, not to mention functional), currently shows four "channels" (more coming soon). Each of these pages hosts a particular type of plot. Every time the telescope takes an image that is compatible with that type of plot (as defined per-channel later), these pages auto-update with that plot generated for the latest image from the telescope, such that it functions as a sort of heads-up display for observers.

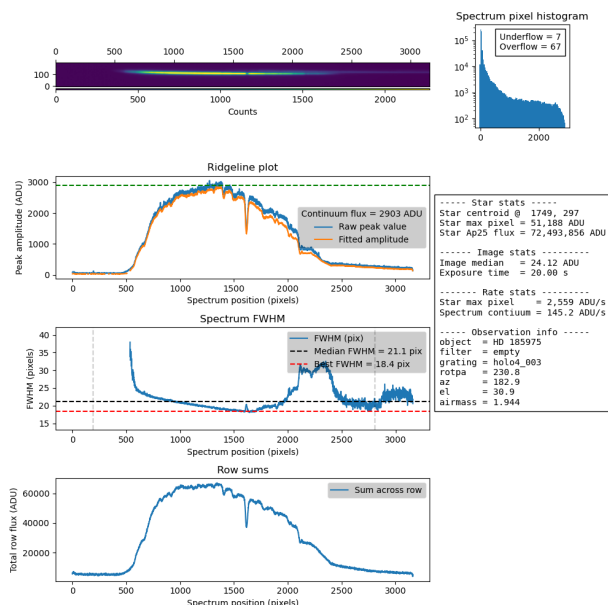
The four channels are:

- **Monitor:** this is just a rendering of the CCD image as a PNG at an appropriate stretch. More stats will be added to this soon, but essentially it's a quick image of the full focal plane after image assembly, instrument signature removal, and cosmic ray repair. This plot made for every image taken.
- **Image Analysis:** this is basically a sort of *imexam* stand in (for those who know what that is - I didn't when I started this!). It provides some basic image stats: contour and 3d renderings of the main object's PSF, a radial plot for that same object (unbinned in radius as a feature), with other useful stats computed, e.g. the peak pixel counts for the main source and its ADU/s etc. This plot made for all non-calibration frames for which a bright source is found in the image.
- **Spectrum Analysis:** this is a super quick and dirty spectral reduction, just for observers to get count rates for the continuum, so they know how long to integrate for in subsequent images. It gives the peak amplitude in ADU along the spectrum (in both pixels and rough wavelength coordinates), and the continuum flux in ADU/s (and peak ADU). This plot is made for all non-calibration images with a disperser in the beam.
- **Mount:** this plot shows the mount positions and torques for the duration of the exposure (sampled at roughly



100Hz), so it can be seen if there is stiction, wind shake, etc. Basically, if those are smooth you know your PSF is going to be OK, modulo focus etc. This plot is made for all images for which the telescope is tracking, and the exposure time is 2s.

The fun part is that you can just open each of these in a new window, and when we're on the sky, you can be a remote observer, just watching the data flow in, seeing exactly what we're up to with zero effort or hitting refresh - no VPNs or anything! Future work on the site will involve adding new channels, improving the interface for which past data is retrieved, as well as writing the backend code to produce the plots for all the images already taken and populate its database.



If anyone reading this thinks "Oh, that's cool functionality, but that website 'could be better', and I know how to make it better because I know how to make websites" please get in touch! I would *love* to get some help with making it less bad, I just don't have the time to learn how to make websites.

@ Merlin Fisher-Levine

A new Astronomer Royal for Scotland

It's a great pleasure to share with the LSST:UK community my [new appointment as Astronomer Royal for Scotland](#). For those not familiar with the role, it dates back to 1834, and has been held by many of the founding fathers in Astronomy. These include the formidable Charles Piazzi Smyth, who was the first pioneering advocate for mountain-top Observatories like Rubin. My research is closest to the 4th Astronomer Royal for Scotland, Frank Dyson, known for his eclipse observations that confirmed Einstein's theory of General Relativity. One century and seven astronomer royals later, and we'll be testing this very same theory with Rubin but now on cosmological scales.

The Astronomer Royal for Scotland has many different roles with science communication and public engagement at the heart. I am primarily an advocate for both professional and amateur astronomers though and am therefore keen to hear from people about what they would like their Astronomer Royal to do in the 21st century. You can contact me [via e-mail](#) and follow the different projects we're promoting on [Twitter](#) @AstroRoyalScot.

I'll sign off with my favourite recent news from Rubin - we now hold two Guinness World Records, even though we're not even open yet! The Vera Rubin Observatory has [the world's "Largest Lens"](#) (1.57m across) and [the world's "Highest Resolution Digital Camera"](#) (3.2 billion pixels). Pretty impressive stuff.

@ Catherine Heymans

Human-machine collaboration in the Zooniverse

As the Zooniverse team get ready to integrate their citizen science platform with the Vera Rubin Observatory platform, we've been thinking hard about how to build smarter projects. Anticipating the volume of data soon to come from the telescope, our assumption is that most classification or searches for unusual objects will use a combination of human and machine classifications.

Then machines can do most of the heavy lifting, but we know from previous work that incorporating human expertise and insight in the loop can improve the final result. The hard bit is deciding exactly which images or data require review, and which can be safely left to our machine collaborators. It's a tricky problem, and not one solved by simply passing those images where the machine is uncertain to experts; in many cases, uncertainty is a sensible response to an image showing, for example, a distant blurry galaxy. Work by Mike Walmsley (now a Turing fellow in Manchester) carried out as part of his thesis in Oxford, showed that one solution is passing volunteers those images where different instances of a trained ML solution were each certain of an answer - but where they disagree with each other.

Mike's galaxy classifying machine has been put to other uses recently. Having learned through collaboration with citizen scientists to classify galaxies, it can be repurposed as a similarity search - give it one galaxy, and it will return those it thinks are similar. (You can try it for yourself at [bit.ly/decals_similarity](#)). This mode of working, where a researcher or a citizen scientist who has found something unusual can immediately search the data for other examples, illustrates a different form of human-machine collaboration likely to be useful in the Rubin era. It's

Closest Galaxy



RA: 184.67458, Dec: 11.73206. [Search VizieR](#)

Similar Galaxies

Show table



something already used to great effect by the Gravity Spy team, who have a dedicated team of citizen scientists sorting through and classifying sources of noise in the hyper-sensitive LIGO and VIRGO data. What works for gravitational waves may be useful for exploring the panoply of astrophysical sources hidden in the Rubin Observatory data.

Further reading: Walmsley et al. 21, [arXiv:2102.08414](#), Zevin et al. 17, [arXiv:1611.04596](#)

@ Chris Lintott

Forthcoming meetings of interest

Several meetings of potential interest have been scheduled for the coming months. As well as the winter DESC sprint week (in week beginning 25th October), the Rubin Observatory has announced an LSST Survey Strategy

Workshop during 16th–17th November (which will be held online). More details are expected in the coming weeks via the DESC Confluence site and the Rubin Observatory Community Forum, respectively.

Note that the current list of forthcoming meeting is always available on the [Relevant Meetings](#) page. You may also wish to check information held on the LSST organisation website [LSST-organised events](#) and the [LSST Corporation website](#)

@ George Beckett

Announcements

Postdoctoral Research Fellow in the Study of Solar System Small Bodies

Applications are invited for a 2-year Postdoctoral Research Fellow in the Astrophysics Research Centre (ARC) at Queen's University Belfast. The successful applicant will work with Dr. Meg Schwamb to develop and exploit next-generation tools for analysing and interpreting future Solar System moving object detections from the Vera C. Rubin Observatory Legacy Survey of Space and Time (LSST). Rubin Observatory science operations are planned to begin around mid-2024, with the survey expected to discover millions of asteroids and tens of thousands of distant Solar System planetesimals. The post will focus on developing software pipelines and utilities for LSST Solar System science and applying these techniques to present-day LSST-precursor datasets. This includes the development of a pipeline to discover distant Solar System bodies beyond ~100 au that are not expected to be discoverable by the main Rubin Observatory Solar System Processing pipeline.

To read the full details and to apply, visit: https://hrwebapp.qub.ac.uk/tlive_webrecruitment/wrd/run/ETREC107GF.open?VACANCY_ID=924394FIBS&WVID=6273090Lgx&LANG=USA

Application Deadline: October 13, 2021

ARC website:

<https://www.qub.ac.uk/research-centres/astrophysics-research-centre/>

If you have significant announcements that are directly relevant to LSST:UK and would like to share the announcement in a future newsletter, please contact the [LSST:UK project managers](#).