

Regulus

Newsletter of the RASC Kingston Centre

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May, 2025



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Centre Events for May, 2025:

- May 7: Zoom Social Meeting
- May 10: Science Rendezvous at Queens
- May 10: Queens Observatory Open House
- May 14: Monthly meeting 7pm at Queens University
Room 226, Ellis Hall,
58 University Avenue, Kingston
- May 21: Zoom Social Meeting
- May 22: Astrophotography Zoom session
- May 28: Zoom Social Meeting
- June 1: Regulus Deadline
- June 4: Zoom Social Meeting
- June 11: Monthly meeting 7pm at Queens University



Greetings, members of the RASC Kingston Centre.

We are finally going to have an in-person meeting! Our May meeting will be held at our usual location at Queens on May 14th.

Ellis Hall Room 226

Parking is free after 5 p.m. on Queens campus surface lots, including the Mackintosh-Corry Parking Lot nearby (access from Union Street near Frontenac St).

Our presenter will be John Moores on his book "Daydreaming in the Solar System."

We will also have a report after the break from Centre member John Chiswick on a project called the NWNK Dark Skies Project.

And Rick Wagner will tell us What's Up in the Sky.

We will meet at the Portsmouth Tavern before the meeting, at about 5pm for supper.

It will be nice to get back to in person meetings!

As an astrophotographer, I do get a thrill when an image seems to "work". There is a lot of hit and miss in this hobby.

Sometimes there's just no making your data work.

But I like this image of Gum 37. I think the details are good, and the colours turned out well.

It is a 4 panel mosaic, captured remotely with the 11" Edge HD in Chile.

I will be using this image at the next session of Astrophotography 101 (via zoom) as the demo data for a presentation on Mosaics.

The zoom invitation will be sent out on the Centre email Chat list.

The meeting will be on May 22nd this month, a week later than the previous months meetings as I will be out of town for a few days.





It's a lovely time of year. The truly cold nights are gone; the insects haven't arrived; Orion is still visible and there are lots of galaxies to see; and the Milky Way is rising in the east if you stay up late enough.

The first star party of the year is the Spring Star Party at the Johnson RV Park near Picton from Friday, May 9th until the following Sunday. I had initially planned to go, and then I checked the calendar and found that the Full Moon is on the 12th, so there won't be any really dark skies as the Moon will set after the start of Astronomical dawn. So I decided not to go.

There is a silver lining to this, though. It means that I'll be able to attend the Science Rendezvous on Saturday, May 10th, instead. I've always enjoyed doing public outreach, but I have done very little of it since I moved to eastern Ontario. The picture, above, was taken by a reporter for a Burlington, ON newspaper when I was actually able to move my telescope to outreach events at Spencer Smith Park beside Lake Ontario. It was a great spot because people would go for a walk along the lakefront and my 12" Meade SCT would always draw a crowd. However, since getting a working, portable, EQ5 mount, I have left the big Meade in my observatory. I have also taken the 12" SCT off its fork-mount and it's now on an iOptron CEM120. Including the tripod, there must be 80-100 kg's of mass, so it's all staying in my observatory.



I'll either take the 6" RC (on the left) or the 80mm triplet (in the middle) because it's a lot easier to balance a side-by-side configuration if you're only moving one of the smaller scopes!

When I was in Nebraska for the total eclipse in 2017, I took my little EQ5 mount, the 6" RC and my Meade Personal Solar Telescope (an H α telescope). I could fit the PST inside some 50mm finder-scope rings atop the 6". This allowed me to point both telescopes at the Sun. It was a great thing, as it allowed me to quickly swap between viewing sun spots and prominences. I didn't have the 80mm Apo at the time, but it does deliver excellent white light views of the sun when I use a Baader solar filter. I must admit, it's been tempting to get a Herschel Wedge for it, but I frankly don't do much solar observing, so I haven't seen the need. There are other things I'd prefer to spend my money on.

The other thing I'm playing with at the moment is that I'm trying to set up a Raspberry Pi 5 Single Board Computer as the brain for an all-sky camera. At first, I'll use a ZWO ASI462 camera (the one that will do colour and infra-red, and which I've used for producing a 15frames per second video of the Aurora), and then maybe transition over to a camera that is used in cars for back-up purposes. These latter cameras are cheap, sensitive, have a huge field of view and they don't need a clear dome to protect them.

I found a Raspberry Pi 5, brand new in a box in Ottawa, for \$75, which is an excellent price.

The problem is that I can't seem to get it to start up. It does show the "splash" screen if I don't put a micro-SD card in that has an operating system on it, but it steadfastly refuses to run when I do.

I do have an all-sky camera working down by the observatory that is plugged in via a USB cable into my observatory computer, but I'd really rather it be a stand-alone device.

I'll keep you posted!

Clear skies to you!

Roger Hill



William Shakespeare is probably the greatest writer the world has ever seen. Was he capable of writing something poorly, if he really tried? I doubt that. He lived four centuries ago. Born in Stratford, he was successful in London, and he retired and died in Stratford.

Scholars have worked on every possible aspect of Shakespeare for centuries. My doctoral thesis dealt with an aspect the others largely ignored: Shakespeare and

the night sky. Not so much science, or astronomy, but the simple majesty of the sky. When he was 8, his father probably showed him Tycho Brahe's brilliant stella nova. A new star it was not, but instead a massive old star blowing up. Years later the star found itself in the opening lines of Hamlet:

Last night of all,

When yond same star that's westward from the pole

Had made his course to illumine that part of heaven

Where now it burns, Marcellus and myself,

The bell then beating one

Many critics have praised Shakespeare's curiosity about Nature—trees, flowers, animals, but I think he enjoyed a special and enduring interest in the night sky. The iambic pentameter lines point to where the supernova would have lit up the sky, around 1 am. in late autumn.

It is possible that Shakespeare, who as a youth developed interests in all of Nature, forged a particular thirst for the night sky. Thanks to his reference in the opening lines of Hamlet, I think it likely that Tycho's star led to that passion. But this concern did not begin and end with the simple beauty of the night sky. Especially in his later works, he also developed an inquisitiveness about the cosmos itself, and about how time, though carefully measured in seconds on Earth, passes unhurriedly throughout the cosmos, not in seconds or hours but over billions of years. In preparing my Doctoral dissertation at the Hebrew University, I found more than two hundred allusions to the night sky in Shakespeare's canon. But in Macbeth alone I counted 59 references to Time. Here are two of them:

Time, thou anticipat'st my dread exploits:

The flighty purpose never is o'ertook

Unless the deed go with it. (4.1.144-146.)

Shakespeare portends that the progression of time is not always linear. Macbeth addresses Time directly in this passage. Macbeth is continuing his murderous rampage, but time itself knows that the deed itself, to take place in the future, will confirm the bloody purpose. The unity of time and space, which Einstein posited in his Special theory of relativity, in 1905, took place 299 years after Macbeth was probably written. In his essay on special relativity, Einstein added the dimension of time to the three dimensions of space, because the observed rate at which time passes for an object depends on the object's velocity relative to the observer. Einstein expanded his thought in general relativity, in which he demonstrated that a gravitational field can slow the passage of time for an object as seen by an observer outside that particular gravitational field.

To me you speak not.

If you can look into the seeds of time,

And say which grain will grow, and which will not,

Speak then to me, who neither beg nor fear

Your favours nor your hate. (1.3.55-61.)

In this passage Shakespeare has Macbeth speak directly to Time as if it had a personality, even seeds or parents and children. He is asking time if it could tell him (like the weird sisters) whether his enterprise would succeed or fail. In the play, his enterprise clearly fails with the four-word rapturous stage direction "*Dies. Fleance escapes.*" (3.3.17)

As the play nears its denouement, Macbeth is informed of the death of his wife. I like to imagine that the speech that follows is divinely inspired, as it is one of the finest scripts ever to touch paper: I quote it here, as it appeared in the First Folio published in 1623. I also take the liberty of adding two words at the end:

She should haue dy'de hereafter;

There would haue beene a time for such a word :

To morrow, and to morrow, and to morrow,

Creepes in this petty pace from day to day,

To the last Syllable of Recorded time :

And all our yesterdayes, haue lighted Fooles

The way to dusty death. Out, out, breefe Candle,

Life's but a walking Shadow, a poore player,

That struts and frets his houre vpon the Stage,

And then is heard no more. It is a Tale

Told by an Ideot, full of sound and fury

Signifying nothing.

[Signifying ... everything.]

I am happy that the conclusion I reach here never made it to my dissertation, as I am certain that some scholars would have rejected it. But in this article, where I get to write what I like, I suggest that without being aware of it, Shakespeare anticipated Einstein's theory of General Relativity by about three centuries. I also think that the culmination of the playwright's wording points to those final two words that quite possibly might have entered the poet's mind at the time, for surely his mind was aware of the status of that speech.

The next time you go out of doors and look at the evening sky, you may behold two of its features. One is the planets and stars that appear. The other is this collection of ancient words that potentially add a new dimension to our appreciation of the cosmos of which, for just an instant, we belong.

PS

I remember when I was young, Dad threatened me that if I didn't inherit his love of Shakespeare, he would disinherit me. I think he would be pleased that I carried that love as far as I did.

It was hard to find an appropriate picture for this. The one I chose is a picture I took years ago of NGC 6709 and its field. On 13 November, 1984, I discovered my first comet in this field.





Any night of the week can offer up a broad range of viewing wonders. RASC KC Past President Rick Wagner keeps an eye on the sky for us each month, sharing some of the best viewing opportunities as well as timings to catch your favourite night sky target at its best.

The Skies in May

02 May – Venus (mag -4.8) and Saturn (mag 1.2) are just 4° apart, Mercury (mag 0.1) is 17° lower left of Venus and about 05:40EDT the ISS (mag 0.8) passes by the planetary triangle. All this happens very low in the eastern sky shortly before sunrise.

02 May – (4) Vesta (mag 5.6) at opposition - the only minor planet visible to the unaided eye.

03 May – Moon occults γ Cnc, Mars & M44 nearby (about 22:00EDT)

03 May – (2778) Tangshan occults UCAC4 569-042951 (mag 12.0) from Winchester to Morrisburg (about 23:00EDT)

04 May – First Quarter Moon

04&05 May – Mars skirts the northern edge of open cluster M44

05 May – Saturn ring plane passes north of the Sun - no visible shadow of the rings on the planet

06 May – η Aqu meteor shower (dust particles from Comet Halley) peaks (best from 3-4AM)

09 May – (9) Metis (mag 9.6) at opposition

10 May – (28116) Kunovac occults UCAC4 369-066424 (mag 12.0) from Centerville to eastern Kingston (about 22:00EDT)

12 May – Full Moon (12:56EDT)

20 May – Last Quarter Moon

22-24 May – watch the thin crescent Moon pass Saturn (mag 1.1) and then 175-times-brighter Venus (mag -4.5) low in the eastern dawn sky

26 May – very old (18.5hrs before new) Moon extremely low in ENE just before sunrise

26 May – New Moon (23:02EDT)

28 May – very young (21.5hrs after new) Moon extremely low in NW just after sunset

29 May – (16955) 1998 KU48 occults UCAC4 354-181493 from Bellrock through Yarker and Centerville to Bath (about 03:20EDT)

31 May – Titan's shadow starts to transit Saturn's disk shortly before sunrise

31 May – Venus (mag) at Greatest Elongation West from the Sun in the dawn sky.

Ariel: Exploring the atmospheres of Exoplanets Canadian Space Agency

Launch: 2029

Mission duration: 4 years with possibility to extend

Mission status: In development

Monitoring distant and diverse worlds, Ariel (Atmospheric remote-sensing infrared Exoplanet large-survey) is a European Space Agency-led mission that will characterize more planets beyond our solar system than ever before. The space telescope will monitor these exoplanets atmosphere, ranging from rocky planets to gas giants, from a point in space called Lagrange 2, 1.5 million kilometres away from Earth, sharing this location with the James Webb Space Telescope. Ariel will study approximately a thousand such planets, measuring the molecules, clouds, winds in their atmospheres and their thermal structures.

Ariel will study exoplanets in two complementary ways: transit and emission spectroscopy.

Spectroscopy refers to splitting the colours of light, as with a prism. Ariel will focus on visible and infrared light, which are most informative for planets. When a planet transits in front of its host star, light from the star filters through the upper atmosphere of the planet and is imprinted with the signatures of atoms and molecules which can then be observed. This is the best way for astronomers to figure out what exoplanets are made of.

Emission spectroscopy means studying the light given off by the planet itself. Light tells us about the temperature at different places in the atmosphere.

By combining transit and emission spectroscopy, Ariel will paint a holistic picture of hundreds of exoplanets and their atmospheres.

Ariel is designed to:

Perform a large-scale survey of exoplanets

Study the chemical composition and temperature of exoplanet atmospheres to better understand planet formation and atmospheric properties

Canada will supply components called cryoharnesses, which are crucial electrical data cables, connecting the telescope's complex imaging detector arrays to the spacecraft's computer. Cryoharnesses are optimized to transmit electrical signals without transmitting too much heat. While the detectors operate at very cold temperatures (40K or -230 °C) the computer is at "room temperature" (293K or 20 °C), therefore the cryoharnesses must be compatible with this challenging range of temperatures.

In fall 2023, ABB Inc. was selected to develop this set of space-qualified power and data cables and their interfaces. ABB Inc. has contributed similar technology to other missions, notably for the James Webb Space Telescope.

For this investment, Canadian scientists will get to participate in important research. Up to 12 Canadian scientists will be invited to join the Ariel Mission Consortium, allowing them to select targets, define science objectives, and gain privileged access to Ariel's data.



Target for Tonight.....Virgo!

Ah Virgo, what can I say...maybe...'All hope abandon, ye who enter here!'

I have struggled with what I could say that might make this month's constellation easier to tackle. There is plenty to see

here, the trick is in the sorting. I found searching this area required a good chart that gives the orientation of the galaxies and comments on shape such as 'round' or 'edge on' are helpful. In confirming what is seen a photo is helpful. An easy online source for many of those listed is <https://theskylive.com/>. Stephen O'Meara also has a book dedicated to the Messiers alone. Sky and Telescope has published 100 of Sue French's columns in Deep Sky Wonders. This book contains finder maps as well as many photos. All objects can be found in the free software Cartes du Ciel.

Challenge object quasar 3C 273 is 'stellar' in appearance. It is faint (mag13) and this search would most likely benefit from the use of a chart generated with the AAVSO software. I found using the finder to aim for 3/8 of the distance from 16 Vir to gamma Vir and slightly above the line that connected them, landed me in the 2 degree AAVSO chart. The asterism that I used to identify the field is marked on the chart. While mag 13 is doable at my house, sky quality did not allow me to see it on this particular night.

ETU: Double star HIP 63081 or Σ 1689 is a pair of 7.1 and 9.1 mag 30" apart, and lies very close to Vindemiatrix.

ETU: Bright star of note is Spica, with an apparent magnitude near 1, an oft used sign post in navigating the night sky.

Optional Variable for ETU: R Virginis is a long period variable but a short one for this class with a period of only 146 days and a satisfying range of mag 6.1 to 12.1. You can download an appropriate variable chart, R Vir.

All but one of the Virgo Messiers are located just below Coma Berenices. By increasing RA they are: M84, M86, M87, M89, M90, M58, M59, M60. M49 and M61 are slightly below this group. M104, the Sombrero Galaxy is further south at the border with Corvus. Layered in with the main cluster of Messiers are most of the Finest NGC objects. (NGC 4216, NGC 4388, NGC 4438/4435, NGC 4567/8, NGC 4762).

Close to M49 are NGC 4526 and 4535. NGC 4517 is south of these and NGC 4699 is on the way to the Sombrero. NGC 5746, very far from the others, is very near the star 109 Vir.

An item of interest is Markarian's Chain, a group of 8 galaxies determined by an Armenian astrophysicist, Benjamin Markarian to have a common motion. 4 of these are included in the Virgo list, M84, M86, NGC 4438 and NGC 4435. Absent members are NGCs 4461, 4477, 4458, as well as NGC 4473 which is included in the Levy list for Coma Berenices.

The Levy list is extensive for this area and as you search for the already mentioned objects you will see many that you will no doubt record to sort out with charts and photos after the fact. I will offer here a quick guide to get you started.

Levy objects (recorded here in NGC numbers) found in the area of the greatest concentration of Messiers and Finest NGC are: 4519, 4539, 4570, 4591, 4596, 4623, 4636 (noted as having a bright core), 4688, 4713, 4779, 4795, 4866.

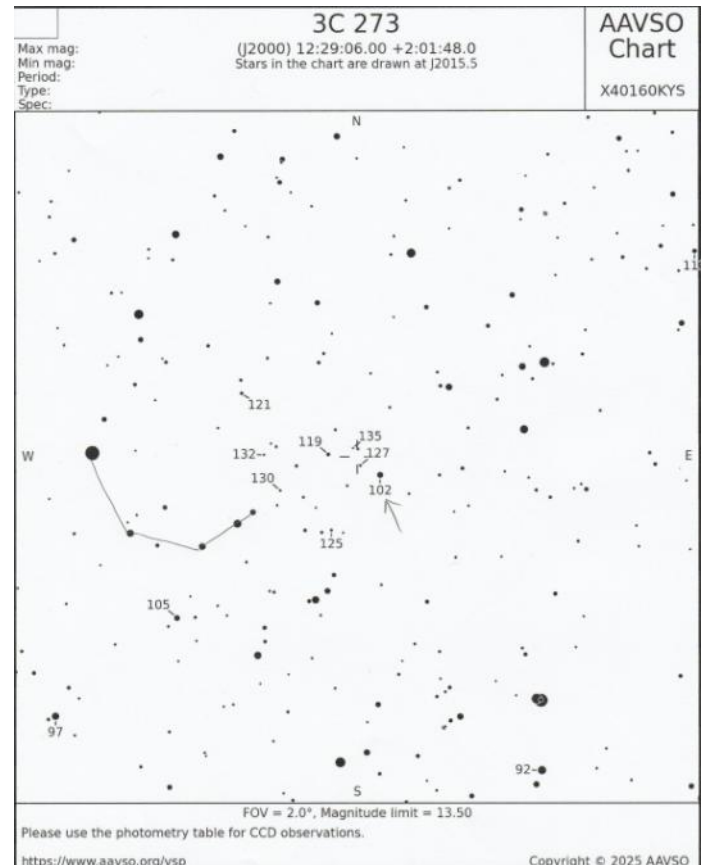
Levy objects... in an area east of Vindemiatrix: 4772, 5020, 5147.

...near 109 Vir: 5364, 5638, 5668, 5690.

... in a small group between M5 in Serpens and 109 Vir: 5838, 5846, 5850.

... in the vicinity of Finest NGC 4699: 4126, 4818.

... in the area below the main asterism of Virgo reaching toward Hydra: 5068, 5146, 5247, 5427, 5634 (globular cluster).

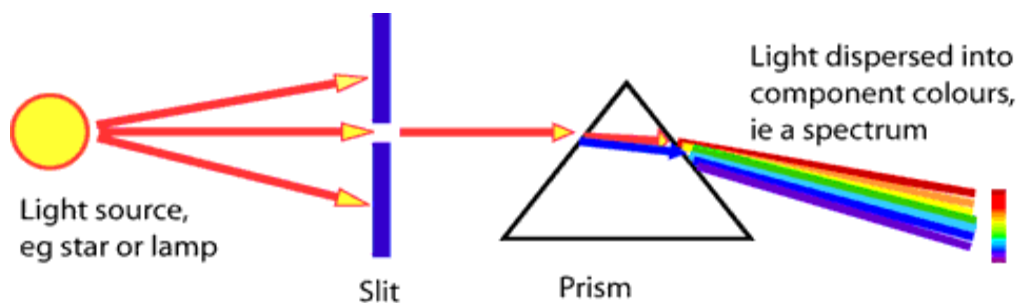


How does a Spectrograph Work?

A spectrograph is an instrument used to obtain and record an astronomical spectrum. The spectrograph splits or disperses the light from an object into its component wavelengths so that it can be recorded then analysed. These steps are discussed in more detail below.

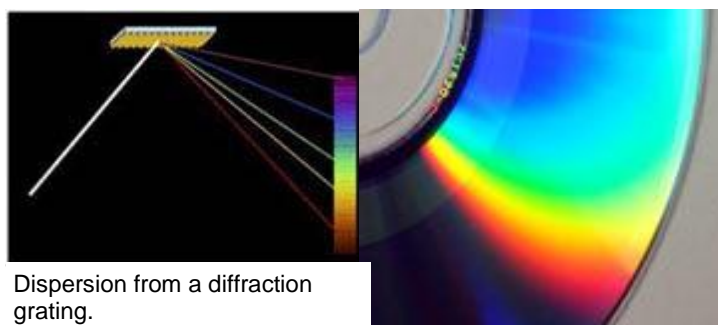
Dispersing Light

Light entering a spectrograph can be split or dispersed into a spectrum by one of two means, using a prism or a diffraction grating. When Newton split light into a spectrum in the 1660s he used a glass prism. School students often use perspex prisms from ray box kits to disperse or "split" white light from an incandescent bulb into the component colours of the spectrum. This effect arises due to the fact that the different wavelengths of light also have different frequencies. As they pass through a prism, they undergo refraction, a change in velocity due to the change in medium. If the light falls incident to the prism at an angle other than 90° it will also change direction. Red light has a longer wavelength than blue light so its angle of refraction is lower, both at entry to and exit from the prism. This means it gets bent less. The light emerging from the prism is dispersed as shown schematically in the above diagram



Dispersion of light through a prism

Most astronomical spectrographs use diffraction gratings rather than prisms. Diffraction gratings are more efficient than prisms which can absorb some of the light passing through them. As every photon is precious when trying to take a spectrum from a faint source astronomers do not like wasting them. A diffraction grating has thousands of narrow lines ruled onto a glass surface. It reflects rather than refracts light so no photons are "lost". The response from a grating is also linear whereas a prism disperses blue light much more than in the red part of the spectrum. Gratings can also reflect light in the UV wavebands unlike a glass prism which is opaque to UV. A common example of a diffraction grating is a CD where the pits encoding the digital information act as a grating and disperse light into a colourful spectrum.



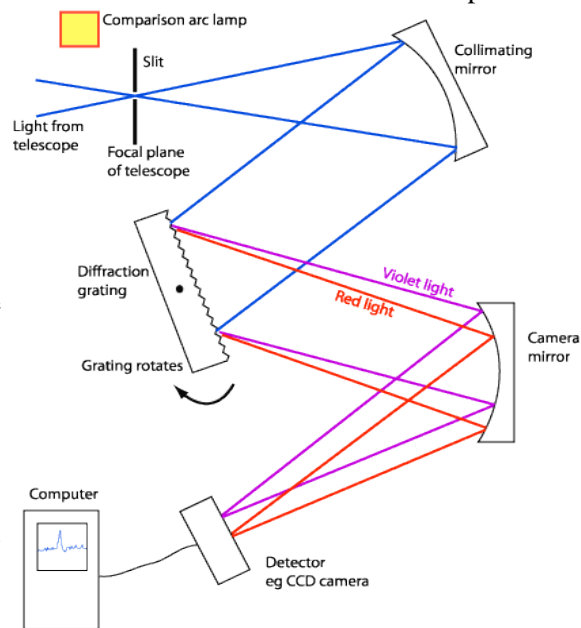
Dispersion from a diffraction grating.

Diffraction from the pits in a CD

Structure of a Spectrograph

The schematic diagram below shows the key components of a modern slit spectrograph.

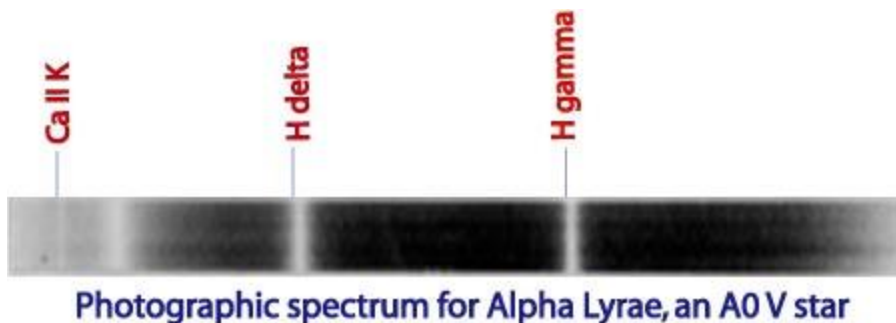
The slit on the spectrograph limits the light entering the spectrograph so that it acts as a point source of light from a larger image. This allows an astronomer to take a number of spectra from different regions of an extended source such as a galaxy or of a specific star in the telescope's field of view. Light is then collimated (made parallel) before hitting a diffraction grating. This disperses the light into component wavelengths which can then be focused by a camera mirror into a detector such as a charged-couple device (CCD). By rotating the grating different parts of the dispersed spectrum can be focused on the camera. The comparison lamp is vital in that it provides spectral lines of known wavelength (eg sodium or neon) at rest with respect to the spectrograph, allowing the spectrum of the distant source to be calibrated and any shift of spectral lines to be measured.



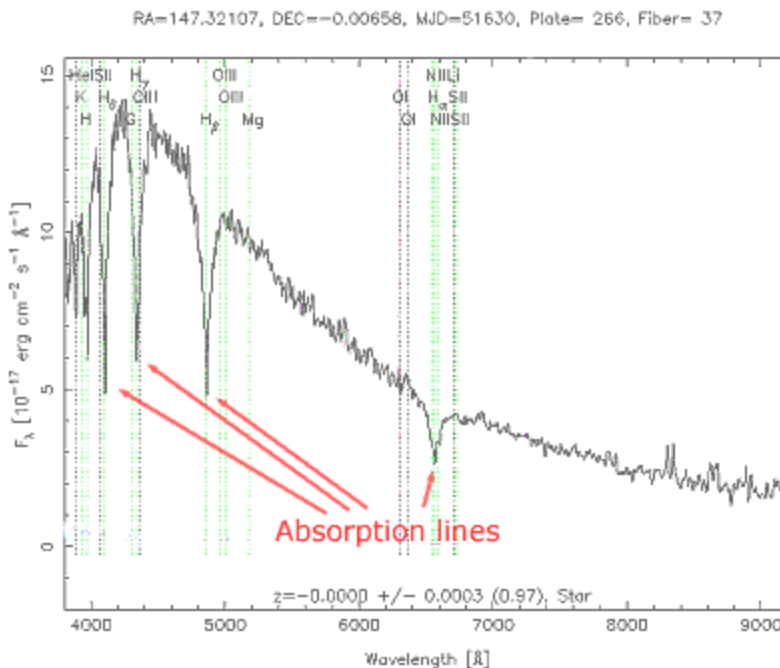
A Schematic Diagram of a Slit Spectrograph

Recording the Spectrum

Newton recorded the spectrum of sunlight by drawing it. The rise of spectroscopy for astronomical use was in part due to its linkage with another emerging technology - photography. Astronomical spectra could be recorded by photographing them on glass plates. This was a far superior approach to viewing them with through an eyepiece and trying to draw the image. Photographic records of spectra could be stored for later analysis, copied for distribution or publication and the spectral lines could be measured relative to spectral lines from a stationary lamp producing spectral lines of known wavelength. It was only by observing and photographing the spectra of thousands of stars that astronomers were able to classify them into spectral classes and thus start to understand the characteristics of stars. Photographic spectra were generally recorded on glass plates rather than photographic film as plates would not stretch. The image of the spectrum was normally presented as a negative so that the absorption lines show up as white lines on a dark background. The example above shows the photographic spectrum of a standard reference star, α Lyrae from the 1943 *An Atlas of Stellar Spectra*.



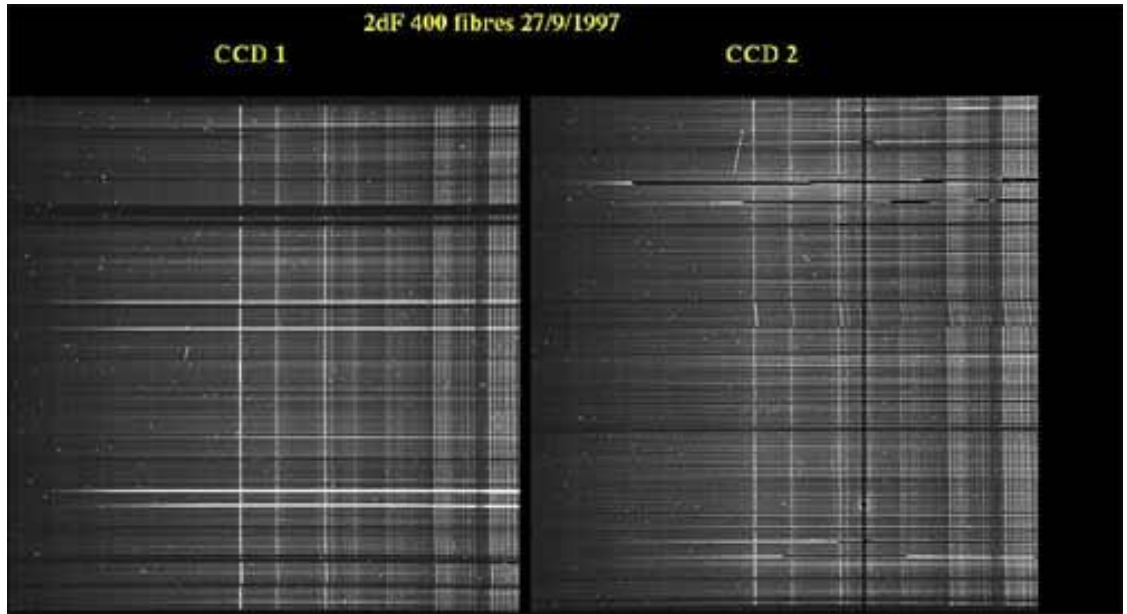
Photoelectric spectroscopy allows spectral information to be recorded electronically and digitally rather than on photographic plates. Modern astronomical charged-couple devices or CCDs can reach a quantum efficiency of about 90% compared with about 1% for photographic emulsions. This means a CCD can convert almost 9 out of 10 incident photons into useful information compared with about 1 in 100 for film. Using a CCD an astronomer can therefore obtain a useful spectrum much quicker than using a photographic plate and can also obtain spectra from much fainter sources. CCDs have a more linear response over time than photographic emulsions which lose sensitivity with increased exposure. A spectra recorded on a CCD can be read directly to a computer disk for storage and analysis. The digital nature of the information allows for rapid processing and correction for atmospheric contributions to the spectrum. Modern spectra are therefore normally displayed as intensity plots of relative intensity versus wavelength as is shown here for a stellar spectrum.



Multifibre Spectroscopy

The last decade has seen the growth in multifibre spectroscopy. This involves the use of optical fibres to take light from the focal plane of the telescope to a spectrograph. A key advantage of this technique is that more than one spectrum can be obtained simultaneously, dramatically improving the efficiency of observing time on a telescope. Many of the techniques for multifibre spectroscopy were developed at the Anglo-Australian Observatory for use on the AAT and the UK Schmidt telescopes.

The 2dF project revolutionised the emerging field of multifibre spectroscopy by using a computerised robot to precisely position 400 minute prisms onto a metal plate so that each prism could gather light from an object such as a galaxy or quasar. Attached to each prism was an optical fibre that feeds into a spectrograph. The 2dF instrument sits at the top of the AAT and can take spectra from 400 objects simultaneously over a 2 degree field of view. Whilst observing one field, the robot sets up a second set of prisms on another plate which can then be flipped over in a few minutes to begin observing a new field. This incredibly efficient system allows spectra from thousands of objects to be obtained in a single night's observing run



Two key projects, the [2dF Galaxy Redshift Survey](#) and the [2dF QSO Redshift Survey](#) provided the scientific impetus for building this multifibre instrument. These surveys produced accurate data on over 250,000 galaxies and 25,000 quasars that have proved an immense boon for cosmologists studying the formation and

Spectroscopy at other Wavebands

Spectroscopy is not just the tool of optical astronomers. It can be carried out at all wavebands, each of which provides new insights into the structure and characteristics of celestial objects.

Infrared spectroscopy allows astronomers to study regions of star birth obscured to optical astronomy by cold clouds of dust and gas. Australia is actively involved in infrared astronomy and has built infrared spectrographs such as IRIS 2 for the AAT and the ANU's 2.3 m telescope at Siding Spring. The [Research School of Astronomy and Astrophysics](#) at Mt Stromlo in Canberra was building the Near IR Integral Field Spectrograph (NIFS) for the 8.1 m Gemini North telescope in Hawaii when fire destroyed most of the facilities on the mountain in early 2003. A replacement NIFS has now been made and will soon be in use on Gemini.

High-energy spectroscopy in the X-ray and γ -ray regions is more difficult as the instruments have to withstand the rigours of a rocket launch and the harsh environment of space. As high energy photons have much shorter wavelengths traditional optical designs for spectrographs are not suitable or able to be adapted. The resolution of high energy spectrographs cannot match optical ones at present but they allow us to gain greater understanding of violent, energetic objects and events in the Universe.

Radio astronomers also gain spectral information from their observations. Receivers used on radio telescopes can pick up thousands of bands in a given region of the radio band just as you could obtain by moving a radio dial through several stations and measuring the intensity of the received signal. This information effectively provides details about the various transitions emitted by matter. Radio spectral data can give details about frequency and velocity. It can also provide information about the polarisation of the signal, information not normally available in visible spectra. Improvements in receivers and detectors now allow astronomers to routinely observe at mm-wavelengths where there is a wealth of spectral lines from molecules in space. Molecules such as acetic acid and formaldehyde have been discovered in interstellar clouds and the search continues for the signature of amino acids such as glycine. Information on these will prove vital for astrobiologists and astrochemists..

From December 27, 2015

Most astronomical instruments do not come in anything that resembles standard shapes and sizes of normal cargo. It's not like you go down to the local post office and ask for "one of those boxes for shipping satellites you have out back". Getting the instruments from A to B usually requires a little more effort, as it is sensitive equipment, often in odd shapes. But sometimes you are in the lucky situation where a more ordinary container can be used with success.

Stereo1_med

Artists' illustration of one of the STEREO satellites. Photo credit: NASA STEREO

In October 2006, NASA launched the STEREO mission, which consists of two, nearly identical satellites, with the purpose of making stereoscopic observations of the Sun to study, for instance, coronal mass ejections and other Solar phenomena. But first the satellite and the instruments on board had to be assembled, which involved shipping some instrument parts in... non-standard containers.

The IMPACT instrument, which is used to study the energetic particles from the Sun, is mounted on a large extendable boom that would be deployed after the satellite had launched. But first the boom and the instrument had to get to the facility where the satellite would be assembled.

On one of many travels from a STEREO meeting, the IMPACT project manager, Dave Curtis, and IMPACT engineer Jeremy McCauley were discussing the status of the instrument. They had come up with a stable and functional design for the boom, but schedule was getting tight. The boom had to be sent to Los Angeles for testing, only a few weeks in the future.

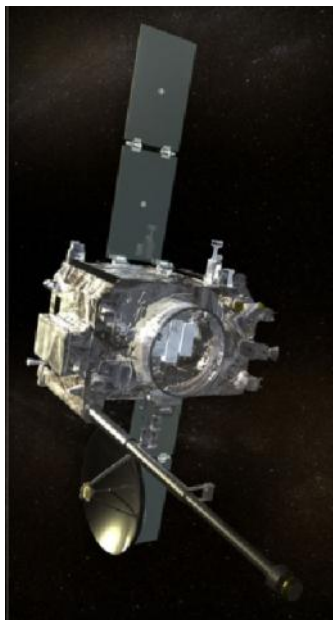
Jeremy had been running the preliminary design numbers and figured that they needed a roughly man-sized box to transport the boom. To this, Dave quipped, "Wouldn't it be great if we could just use a coffin?" They had a good laugh about that, and went back to work.

STEREOTransportCaseEricBellm

The STEREO boom transport case. Thanks to Eric Bellm for providing the photo.

A few days later, Jeremy returned to Dave's office, asking if he had been serious about using a coffin. He had researched both options, and learned some interesting facts about caskets along the way.

Caskets can be made from metal, which was a requirement for STEREO, and one could be bought for \$6000 and delivered within two days. For comparison, a custom built metal case would've cost more than \$12,000 and taken 6 weeks to get delivered. Being on a tight schedule, the choice was obvious. A casket was ordered, and the boom shipped to LA in this rather unconventional container.



“Mind your words, young man”

Astronomical observations are naturally very sensitive to light pollution, which is why you typically place observatories in desolate locations. Even there, you are not guaranteed success, as someone may turn on the light in the dome, shine a flashlight towards the telescope etc. meaning that your observations will be ruined.

Young George Coyne was observing at the Vatican Observatory in Castle Gandolfo, when someone opened the door to the observatory and let in a lot of light, ruining the exposure. George shouted “close that bloody door”, after which the visitor promptly vanished, closing the door behind him. George then continued his observations for the remainder of the night, without further interruptions.

The following day, Pope Paul VI reminded him “my son, you should be in better control of your temper.”

Guess you never know who might be popping by the observatory at night...

Wednesday, April 9, 2025

Minutes of the RASC-KC Regular Monthly Meeting

The meeting began at 19:10EDT. Malcolm Park welcomed Kingston Centre members and guests with 20 on Zoom screens in attendance. Special welcome to our new members, John Criswick, Katharine Smithrim, and Christina Luzius-Vanin. Malcolm shared an image of the solar eclipse, 1 year ago, from Lac-Mégantic. The meeting was to be in person at Ellis Hall, Queen's University, however, graduate students are on strike, and we opted for Zoom only.

Aurora Borealis: A Natural Wonder. This month's speaker, Jeff Booth, began by giving us an overview of their Toronto Centre E.C. Carr Astronomical Observatory, near Blue Mountain, where he observed the aurora in August of 2019, then again May 10, 2024. Sharing aurora images throughout, Jeff discusses significant historical events, the mechanism of the formation of the Aurora Borealis and the Aurora Australis and their different colours, and equipment used with suggestions for astrophotography. This presentation begins at the 3-minute mark on our recording on our YouTube channel. David Levy Reads Poetry: On the theme of loss, David read from a poem by Annah Senesh, 'Yesh Kochavim – There are Stars'.

Rick Wagner:

Astronomy this month - April 2025

Local Events:

03 - May International Astronomy Day

BAA Events:

None this month

AAVSO Webinars:

03 May – How NASA, Citizen Scientists Help Avert Disaster

L&A Dark Sky Viewing Area:

19 Apr - Astrophotographers Assemble

25&26 Apr – Laser-guided Tour: reg'n req'd

10 May – Up Close with the Moon

North Frontenac AP

12 Apr – Shoot the Moon – lunar observing

27 Apr – Lyrid meteor shower

Sky Events – Apr:

11 Apr – Mercury (mag 0.9) and Saturn (mag 1.2) 7 degrees below Venus (mag -4.7)

low above the eastern horizon shortly before sunrise (6AM)

12 Apr – Full Moon (20:22EDT)

18 Apr – waning gibbous Moon just off the spout of the Sagittarius teapot

20 Apr – Last Quarter Moon

21 Apr – Mercury at greatest elongation west – very poor

21 Apr – Lyrid meteor shower peaks tonight

25 Apr – Venus (mag -4.8), Saturn (mag 1.2), and Moon low in the east before sunrise.

Mercury (mag 0.3) 7 degrees down and left from the Moon

27 Apr – New Moon (15:31EDT)

27 Apr – Venus (mag -4.78) at greatest illuminated extent

Sky Events - May

04 May – First Quarter Moon

05 May – Saturn ring plane passes N of Sun

06 May – Eta Aqu meteor shower peaks (AM)

09 May – 9 Metis (mag 9.6) at opposition

12 May – Full Moon (12:56EDT)

T CrB

Transits before morning twilight

Still Faint

Major Planets

Uranus (mag 5.9) very low in the East after sunset

Jupiter (mag -2.0) low in the W after sunset

Mars (mag 0.7) high in SW, sets early morning

Mercury (mag 5.8)

Venus (mag -4.2)

Neptune (mag 8.0)

Saturn (mag 1.2)

Small Bodies

26 Apr – 4 Vesta (mag 5.67) passes just 0.2 degrees lower right of 4.5 mag 16 Librae

02 May – 4 Vesta (mag 5.6) at opposition

Comet SWAN (C/2025 F2) – early in dawn sky

Occultations

18 Apr – 0910 UT (25906) Morrell 20.2

J190117.83+044214.7 11.4 9.1 mag drop 0.8s

03 May – 0255UT (2778) Tangshan 18.4 UCAC4 569-042951 12.0 6.0 mag drop 0.5s

10 May – 0200UT (28116) Kunovac 17.9 UCAC4 369-066424 12.0 5.7 mag drop 1.0s

John Hurley, National Council Rep.

The next National Council meeting is Sunday, April

13th . RASC General Assembly 2025 is April 26 & 27, register online, the member fee is \$30, youth \$15 and entirely via Zoom.

Bruce Elliott:

Science Rendezvous is May 10 th and is an exciting outreach opportunity. Our Centre will be well represented.

Announcements:

Member's Zoom socials on Wednesday's. To join, an email with the Zoom invitation is posted to the Centre's email list. Astrophotography tutorial session via Zoom on April 10 th , end to end image processing. Our monthly newsletter, Regulus, can be found on the RASC Kingston Centre website. <https://kingston.rasc.ca>. On Facebook, we are @RASC Kingston Centre. On YouTube, we are @RASC Kingston Centre. Join our Centre at RASC.CA. Our next meeting will be in person, May 14 th , at 7 pm, Ellis Hall Room 225, Queen's U. Presentations will include John Moore and his book "Daydreaming in the Solar System" and John Criswick on the Narrows Lock/Wesport/Newboro/Chaffey's Lock (NWN) Dark Skies Project. If you do not want to be part of the chat list but would like meeting reminders, email us at kingston@rasc.ca.

Malcolm Park thanked all for the presentations and for attending. The meeting ended at 20:51EDT.

About Us

The Royal Astronomical Society of Canada

The RASC is a national, non-profit, charitable organization devoted to the advancement of astronomy and related sciences. Founded in 1868, The Royal Astronomical Society of Canada is Canada's leading astronomy organization, bringing together over 5000 enthusiastic amateurs, educators, and professionals. In addition to many national services, our 30 Centres offer local programs across Canada.

The RASC Kingston Centre

We are Kingston's Astronomy Club, a local centre of The Royal Astronomical Society of Canada, that was founded on June 2nd, 1961. We hold monthly meetings, on the 2nd Wednesday of each month from September to December and March to June via zoom videoconferencing and in person, from 7:00-9:00pm Eastern Time. Meetings are held in January and February, but are available by Zoom only.

- We do public outreach programs in the form of helping the Cubs and Guides, teachers, Science Fairs and many public Education and Public Outreach events.
- We help our members with questions in astronomy and equipment use.
- We hold private observing sessions.
- We hold public sessions with Queen's University Observatory Open House, on the third Saturday of each month, at Ellis Hall, Queen's University. Details can be found at <https://www.queensu.ca/observatory/>
- We support the local Frontenac, Lennox & Addington County Science Fair (FLASF) with a prize in astronomy.
- We are happy to answer your questions on astronomy.

Board of Directors & Officers for 2024-2025

Directors:

President: Malcolm Park

Vice President: Kim Hay

Secretary: Elena Zanetti

Treasurer: Susan Gagnon

Regulus Editor: Roger Hill

Nation Council Representative: John Hurley

Officers:

Librarian: Kim Hay

Past President: Rick Wagner

Loan Equipment: Kevin Kell

Webmaster: Walter MacDonald

Honourary President: David H. Levy

The Royal Astronomical Society of Canada

Kingston Centre was provincially incorporated as a Not-For-Profit Corporation in September 2005 and has been a registered Charity with the Canada Revenue Agency since September 2006. Our CRA Registration: 827905720RR0001

Benefits of Membership:

RASC benefits:

- Annual edition of the Observers Handbook
- Bi-monthly RASC Journal (digital)
- Monthly Bulletin of the RASC (digital)

Kingston Centre benefits:

- Monthly Centre Newsletter – Regulus
- Weekly social videoconference chat for members and invited guests.
- On the 2nd Wednesday evening of the month, there are meetings open to the public: In-person in March to June and September to December at Queens, July and August outdoors at Lake Ontario Park; and two in January and February that are video-conference only.
- Equipment loan program

Front cover image

This is the group of people who helped out with Science Rendezvous in 2024, and who lived to tell the tale!

The photo was taken by John Ancsin, who was, by at least one account, a great Astro Roadie. It should be noted that this was taken after more than 5 hours of these people being on their feet.

There will be a different crew for this year!