

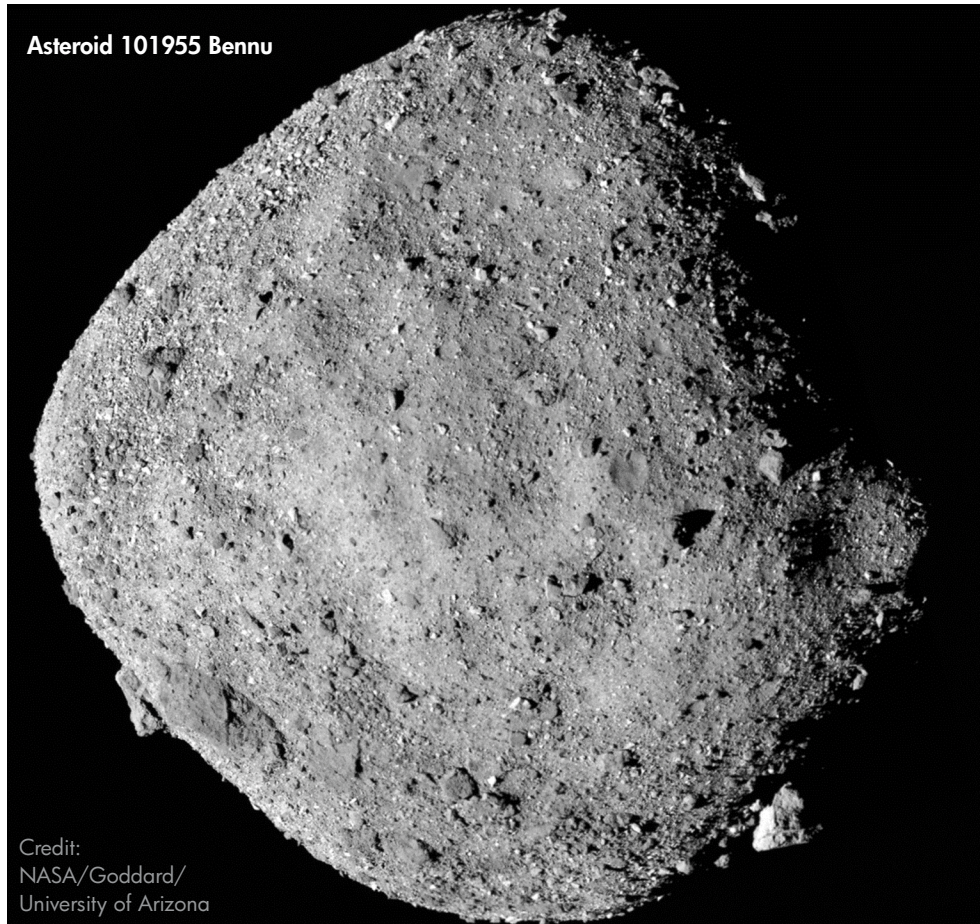
Upcoming Events

- Thursday, April 11 19:00
TBA
- Saturday, April 13 20:00
KAON Session
- Thursday, May 9 19:00
Members' Night
- Thursday, June 13–16
RASC / AAVSO Joint Meeting

- Meetings are held at Mack-Cory Hall, D-214, Queen's University, unless otherwise noted.
- KAON Sessions are held at the observatory, Ellis Hall, Queen's University.

Check kingston.rasc.ca for the latest info, kingston.rasc.ca/observing/sites for sites. ★

Asteroid 101955 Benu



Credit:
NASA/Goddard/
University of Arizona

This mosaic image of asteroid Benu is composed of 12 PolyCam images collected on Dec. 2 by the OSIRIS-REx spacecraft from a range of 15 miles (24 km). The image was obtained at a 50° phase angle between the

spacecraft, asteroid and the Sun, and in it, Benu spans approximately 1,500 pixels in the camera's field of view.

Date Taken: Dec. 2, 2018.
Instrument Used: OCAMS (PolyCam)

In this issue:

- ▶ Reports and Other Items 1
- ▶ KAON Report: March 9 2
- ▶ Event Report: March 18 3
- ▶ An Astronomy Trifecta 3
- ▶ Observing Reports: Feb–Mar . . 4
- ▶ RASC Robotic Scope Update . 11
- ▶ RASC 2019 GA. 12



Reports and Other Items

Leading Edge Hobbies

Greg Latiak reports: They plan on closing the store June 30th; I noticed in the lineup there were some rocketry guys who basically bought out their tubing stock. Between rising overhead, declining margins and the increasing complexity of foreign suppliers, pulling the plug now meant going out on their terms rather than having to file bankruptcy in a few years.

So a real shame because for a lot of this stuff that means shopping

online or a long drive someplace.

Sky & Telescope

F+W Media, the company that owns many hobby-oriented magazines, including S&T, has gone Chapter 11. The future of S&T at this point is somewhat “cloudy.” One recent rumour (on April 1) had the RASC acquiring this iconic magazine to merge with its own, forming *Skynews & Telescope* (an idea that can best be described as *Ridiculous*) but RASC members weren't buying it.

From Kingston Centre, the RASC, and Beyond

Apollo 11

Just ahead of the 50th anniversary of this historic mission, a significant number of Centre members has seen this latest documentary on what is undoubtedly the greatest spaceflight of all time (so far), and all report greatly enjoying it. With re-mastered footage (16K!) it was a must-see for the big screen. The only disappointment was the failure of local theaters to show it in IMAX. ★



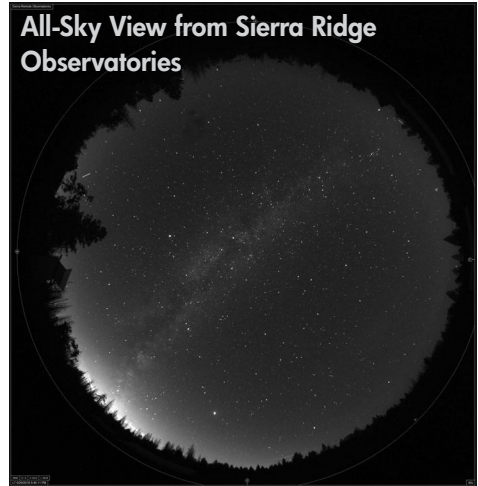
STILL OPERATING ON WINTER HOURS the evening's activities started at 7:30 with the talk by **Larry Widrow** (Queen's U) on "Rediscovering our Galaxy." Once again there were several options on offer: all went to the lecture, then split up to go to the dome, warm room, McDonald Institute, or the observing deck. This seemed to work out much better this month as everyone is getting the hang of wrangling the attendees.

As often happens, the weather was uncooperative for observing and we were faced with over 100 members of the public. The talk was a hit with interesting, thought-provoking tidbits even for those who have heard so much at these talks before. In the lobby we had a table for selling lottery tickets and on the deck **Laurie** and **Devon** set up a scope and held an astro-chat session of their own. **Kim** and **Kevin** brought the new scope, a 6-inch Dob, and we hope to use it some day with better weather.

After the crowds cleared out, **Connor Stone** (Observatory Coor-

dinator) had the remaining volunteers—Queen's and Kingston Centre—assembled on the deck for a couple of photos for a new promotional poster representing our combined efforts. We all got out there and pretended it was clear enough to see something.

Once again it was a good outreach event with many handouts carried away. ★



All-Sky View from Sierra Ridge Observatories
A shot from SRO's all-sky camera showing the sky at the remote site in California where the RASC's robotic telescope lives.

ITEMS OF INTEREST FROM MEMBERS—full articles, or even just a couple of paragraphs are always welcome. Items are gratefully accepted on each and every day of the year! Send items to:

walter (dot) macdonald2 (at) gmail (dot) com



The Fine Print: Members of the Kingston Centre receive *Regulus* as a benefit of membership. Non-commercial advertisements are free to members of the Centre. Paid commercial advertising is also welcome and should be in electronic format.

Submitted material may be edited for brevity or clarity. © 2019, all rights reserved. Permission is granted to other publications of a similar nature to print material from *Regulus* provided that credit is given to the author and to *Regulus*. We would appreciate you letting us know if you do use material published in *Regulus*. ★



RASC-KC Board of Directors

- President:** Rick Wagner
- Vice President:** vacant
- Secretary:** Kevin Kell
- Treasurer:** Susan Gagnon
- Librarian:** Kim Hay
- Editor:** Walter MacDonald
- National Council Rep:** Rick Wagner

Committee Chairs/Coordinators

- Awards:** vacant
- E-mail Lists:** Kim Hay
- Equipment:** Kevin Kell
- Fall'n'Stars:** Kim Hay
- KAON:** Susan Gagnon
- Social Convenor:** Kim Hay
- Tardis Project:** Kevin Kell
- Webmaster:** Walter MacDonald

RASC Kingston Centre
c/o 76 Colebrook Road,
RR#1, Yarker, ON K0K 3N0

E-mail:
kingston@rasc.ca

Website:
kingston.rasc.ca

Event Report: March 18

Kevin Kell

Kim and I stayed in after work to attend the talk by **Dr. Judith Irwin** in Watson Hall 517. Her talk was titled “Climate: the Astronomical Connection.”

Basically it had a lot of questions based on popular media more than anything else. There was a lot of first year university-level math and ther-

modynamic equations, but the graphs helped. The short executive summary answer: all possible positive additions of all effects astronomical could not be the cause of the observed average global temperature increase.

She also says “Hello!” to **Cathy Hall**, another former University of Victoria alumna. There were about

28 people in the audience, including: **Dr. Barry Robertson** (?) who will be speaking at the University Club March 21st at 5:30 p.m. on SNO, **Peter Milliken**, former speaker of the House of Commons, and Judith’s daughter Irene (who apparently was at our last meeting, but I was a little too busy to notice—sorry!). ★

An Astronomy Trifecta: March 21

Rick Wagner

I HAD A GREAT TIME with three separate astronomy events, all coincidentally scheduled on the same day.

1. Dr. Katie Mack’s (NCSU) talk to the Physics Department in the afternoon was excellent and fairly understandable. Basically she talked about some research she did with **Robert McNeese** into the vacuum decay destruction of the universe.

Our universe exists in a local minimum of the Higgs potential, but if there is another deeper minimum available in the potential field and there are nano black holes (on the order of TeV masses so really, really small) which could actually be formed by collisions of ultra-high energy cosmic rays, the black holes would evaporate and could push a small region of space into the deeper minimum. In fact, eventually some spot in the universe must actually quantum tunnel into the deeper minimum even without the black holes. This region or bubble of ‘true vacuum’ would then expand at the speed of light—the surface of the bubble contains all the energy from the change in Higgs potential, so is extremely hot, destroying everything in its path. The interior of the bubble has a completely different physics than our universe (*i.e.* different particles, different masses, different forces) so nothing from our universe could exist (even if it could survive the conflagration of the bubble

surface), and the interior of the bubble would be gravitationally unstable so would collapse within microseconds to a point. She described the “upside” of this catastrophe: the quantum tunnel event would occur on a timescale of 10^{100+} plus years (though of course it’s a random event so could happen tomorrow), it arrives at the speed of light so you can’t see it coming, and there is nobody left to mourn those who were consumed.

The downside (the complete destruction of the whole universe has a downside?!) is that, as Katie quoted **Coleman and De Luccia** (1980) “*one could always draw stoic comfort from the possibility that perhaps in the course of time the new vacuum would sustain, if not life as we know it, at least some structures capable of knowing joy. This possibility has now been eliminated.*” BUT, the fact that we’re still here means that this scenario seems to be unlikely.

The physics question driving all this (aside from the cool factor of calculating the destruction of the universe) is that if there are extra dimensions to our universe (as posited by string theory) then these extra dimensions have to be compactified, *i.e.* curled up very small or we would be able to detect them. So how small do they have to be? The likelihood of vacuum decay destruction of the universe is higher with larger extra dimensions so our continued existence allowed **Drs.**

Mack and McNeese to calculate that the compactified dimensions must be smaller than some limit (which depends on the number of extra dimensions.) Phew, I just had to get that all down to remind myself and get it all straight in my mind.

2. Dr. Barry Robertson’s talk was mostly the usual SNO/solar neutrino problem stuff. What I did find interesting is a little more detail on how the neutrino oscillation (electron neutrinos created in the nuclear reactions at the centre of the Sun get transformed into mu and tau neutrinos) works. Although the neutrinos almost completely ignore the whole mass of the Sun as they escape, there is a very small interaction with the surrounding electrons. This adds a very small extra virtual mass to the electron neutrino. As the neutrino moves outward through the Sun the density decreases so this extra virtual mass decreases. At the point where the mass of the electron neutrino equals either the tau or mu neutrino it can spontaneously change into one of the other types. The mu and tau neutrinos don’t interact with the electrons so, once changed they can’t change back and they fly on out of the Sun. The first neutrino detectors couldn’t detect mu or tau neutrinos so it looked like there was only $\frac{1}{3}$ as many neutrinos from the Sun as we expected. SNO was the first detector which could detect and distinguish

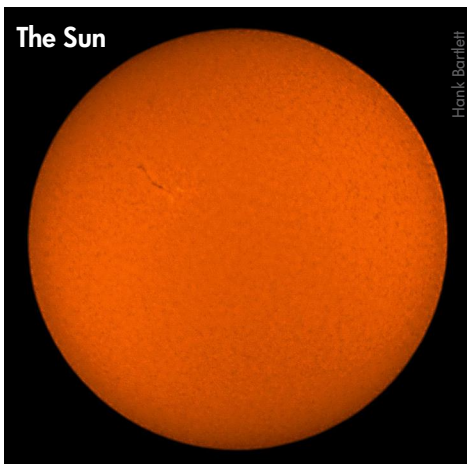
continues on page 12...
regulus-our-neighbor-j3

MONDAY, FEBRUARY 18

Kim [see p.10 of the February issue]: I had sent my information off to Kevin Fetter on the Iridium I observed on January 12, 2019. Since I could not find the path on heavens-above.com. He came back with a reply: "ALOS [Advanced Land Observing Satellite] was coming by at the time, so you got to see a flare from it. No flare predictions for it, like with the Iridium sats." It is very bright, and very cool.

WEDNESDAY, FEBRUARY 20

Hank: Shortly after 4 UT today the [filament](#) in this image [taken Feb 18 at 14:27] separated and dissipated toward the eastern limb of the Sun. At the time it 'blew' away there was a prominence occurrence on the SE limb.



I love solar; it changes without taking decades to do so.

SAT/SUN, FEBRUARY 23/24

Mark K: Wow! We are about 40 clicks from Québec on highway 20 travelling north east. At 1900, a bright [meteor](#) appeared off of our north side going quite slowly and went across the sky to the east. It was low enough that the entire path was visible in our front wind screen. It

dipped in brightness, then flared as it disappeared behind the tree line in the east. Both Linda and I saw it and we had time to discuss what was going on as it happened. It left a visible streak in the sky, but it is too hazy to see if there was a train.

Kevin: Congrats to you. Nothing here sorry. AllSky2 was up and running but we had a lot of intermittent cloud. Nothing registered all night. AllSky1 is still taken down and awaiting some kind of replacement.

Mark K: I am not surprised. We are a lot further north here and it was low in the north and east as it was. It would have been below your northern horizon.

MONDAY, FEBRUARY 25

Rick: Not the conjunction I'm afraid but a couple of images that I shot on Jan 12. Minimal processing, just stacking in AutoStakkert. The [Mars](#) image got the default AutoStakkert sharpening and it shows some detail but it should be properly sharpened in Registax or something. If I had time. [Uranus](#) got no sharpening (artifacts show up almost immediately.) Or maybe it's just a shot of a green LED. You decide.



THU/FRI, FEB 28/MAR 1

Stephen: Last night's clear sky turned out to be a bit of a wash out. High cirrus clouds fogged most of what I tried to get. The zenith was not too bad though so I managed a decent shot of the [Eskimo Nebula](#) in Gemini. Conditions were worsening so I packed it in about midnight.

Paul: I got frosted out...much earlier than midnight! Actually, the battery



in my mount died too, probably to some extent due to the cold temps. I'm still fooling around, trying to get the hang of my 9.25. I may have caught a brief view last night of the [Cat's Eye Nebula](#), but the Eskimo Nebula (also called Clown or Clown Face Nebula) was too close to zenith (my 2" diagonal gets in the way at high altitudes and I was too cold to switch to a 1¼" diag.) I think it was the day after our last meeting I tried for the Clown Face, but the Moon was *right* in front of it! These planetaries seem super tough to see (visually, I mean) from the city. I had no luck whatsoever with [M97](#) (the Owl Nebula) despite my high expectations.

I did catch my main target, [Mercury](#), last night. It was fairly high above the horizon for Mercury, likely the best of 2019. The seeing and the city haze were bad enough that instead of a nice little disk, I saw a lovely rainbow. [M42](#) (the Orion Nebula) was pretty spectacular through it, even when I slipped in an O III filter. When the back deck on my house gets really cold, it introduces bounce into the telescope views that does not present when the heat and humidity are more comfortable for me. I suppose the wood gets spongier and then resists random vibrations under better conditions.

I can report zero success with the [Gegenschein](#), but I didn't expect any in the City of Kingston anyway— it doesn't mean one should not try for it, though.

Rick: I did forget! Only a couple of

...Observing Reports: February–March

hours after reading Kevin’s reminder I was rushing around to get the observatory up and running and that was that.

Hank: Glad to see you are braver than I, and out there in the night air Paul. Yes, when the decks freeze up they groan, crack and bounce. I guess you had better put in a pier.

Rick: Nice shot Steve. You should try to tone down the central portion—the face—to get some more detail in there. If you can’t pull it out of the data you have then you could try a quick session of shorter exposures and then layer the two. You’ve done a great job of catching the fur hood.

I too was disappointed Thursday evening—it clouded over here by ~22:30 so I packed up and went to bed. It’s very frustrating—I think this is the 4th night in the past few weeks on which it has clouded over by 11ish and then clears off to spectacularly transparent skies shortly before sunrise. Each time I spend ½–¾ hour preparing my list of targets for the expected clear night only to throw most of it all in the trash before midnight (because my stars all come to maximum at different times each night, each session plan is only good for that night.)

One of those nights I also had gone to the trouble of shovelling a path and a large flat area for my cliff-top observing site and set up the 12½". I tried and failed for two challenge objects and then it clouded over. (Though one excitement was that one of the targets was the Herbig-Haro objects just south of NGC 1999. After I watched a series of 4 [satellites](#) move very slowly though the field on EXACTLY the same path, I realised that I was looking at the geostationary satellite band. Another half-dozen followed before I left the field. Imaging that field would be absolutely hopeless. I don’t think you could get a single sub without a satellite in it. If anybody wants to

hunt for them I can provide the declination, probably precise to ~5 arcsec.)

I was also disappointed Friday night as, every time we moved from restaurant to museum to pub to bed the sky was clear and there I was in Ottawa. Sheesh, I may have to give up this meeting business, at least on clear nights. Anyway I hold out some hope for Monday and/or Tuesday nights. One benefit of having been in Ottawa was that, driving home this evening in the snow, the light pillars from oncoming cars were spectacular, very sharp—you could separate the pillars from the two headlights, and reaching to 40–50° high. The best was from some horrendous bright light somewhere a few hundred metres south of Roger Stevens Drive on the NE edge of Smiths Falls.

Stephen: My thought exactly. This was just a test shot through hazy skies. Next time I will try 1, 2, 3 and 4 minute shots and see what I get.

Paul: We’ll look forward to it, Stephen! This is such a cool looking nebula.

Kevin: Upon reviewing and discovering bugs in the last week’s worth of AllSky2 camera code, I processed it manually and came across this nice 8-second meteor on the morning of Friday, March 1 at 04:34:32 EST. This came from the WSW and ended in the NNE. I don’t see any reports on the AMS site.



Hank: What a nice meteor that would have been to see naked eye. So who

has the knowledge to explain the slow speed, size, shape, type, altitude, path through our atmosphere, not a meteor?

Rose-Marie: I was happy to see a “good” sparkly a couple nights ago when I took the BigWetNose outside in the evening, there was one going from NW to SE through the head of Leo. Sorry, I didn’t make note of when; I just enjoyed seeing one after this dreary, cloudy winter.

SATURDAY, MARCH 2

Kevin: Just going through the records and have finalized February at 16/28 days of astronomy. It was mostly Kim out in the mornings imaging the planets and observing the Sun at noon or after work. This resolution certainly has increased the motivation level and the helptogetofoawarmcomfychair issues that we face in the winter!

Hank: “March” onwards my friends, better you than I! It is something to be very happy with for sure, plus inventing a new 29 letter word.

TUESDAY, MARCH 5

Kevin: I was just perusing through the AAVSO 2017–2018 Annual Report and came across some interesting items [*see sidebar on next page*].

Hank: Congrats to Kim and all the observers, I must say some of these numbers are amazing given cloudy days. 5090/730 days is 6.9 observations a day.

Cathy: Rick—You might have even older observations than you think... Years ago in Ottawa many of us, maybe you too, did variable estimates, and they were submitted to the AAVSO as a group by Rob McCallum I believe (the Ottawa variable star coordinator at the time). The names of the individuals who made the observations were never

...Observing Reports: February–March

AAVSO 2017–18 ANNUAL REPORT

<https://www.aavso.org/annual-report>

Sunspot Group Leader: **Kim Hay**

Sun Spot Group

The Sun is now approaching the quiet time and is becoming somewhat less active, although with ups and downs on a daily basis, as we go into the solar minimum.

Kim Hay from Yarker, Ontario, Canada, has done an excellent job of collecting, cleaning, and creating the monthly American Relative numbers for the Solar Bulletin. There was a total of 83 observers who contributed 12,558 observations (September 2017–September 2018). Their efforts should be applauded as they continue to monitor our nearest star. We also have many awards to be given for our sunspot observers based on past certificates, and running numbers for FY 2018.

AAVSO Observer Totals 2017–2018 for Canada tallies 42 observers and 33136 observations, including:

R. Wagner, Canada	115
W. MacDonald, Canada	831
W. Morrison, Canada	5090

split out in the submissions...

TUE/WED, MARCH 5/6

Stephen: I finally have a good night. There are a few scattered clouds but they aren't posing too much of a problem. My signal-to-noise ratio is holding up pretty well. I've already imaged [NGC 2392](#) and [NGC 2174](#) and now I'm in the middle of imaging [M94](#). My next targets are M89, M91 and M100. If things hold up I may get them all tonight!

Greg: I am happy for you. All we had were the standard cloud cover all night long. Around 3 a.m. there was a small window to the North that showed stars.

Kevin: You folks have my admiration! The backup weather station showed –24C this morning,

the car showed –26C. I stayed inside where it was a lot warmer. Kim did go out this morning for some nice [Venus](#), [Saturn](#) and [Jupiter](#) shots.

WED/THU, MARCH 6/7

Rick: Interesting—I had exactly the opposite—clear skies all night except for about an hour around 3 a.m. with thin cloud. I was able to increase my guiding exposures and image right through the cloud. Poorer S/N but better than no data at all.

The day before yesterday I got my first [GRB](#) network alert for an INTEGRAL detection so I did a bunch of 400s unfiltered exposures of the area. In comparing the field with a DSS image I couldn't find anything new. It had never occurred to me before about how difficult it might be to find a new 18–20th magnitude 'star' in an image. Though I imaged a GRB afterglow years ago with my 8", I don't remember how I did it. I guess I had a more precise position to look at—this alert specified a 2.5 arcmin error circle.

I also took some time last night to image [NGC 4395](#) for a couple of hours—an odd looking face-on spiral galaxy and a Seyfert. The night before I imaged [Leo I](#) and [Sextans A](#) (aka UGCA205); both are dwarf galaxies. I'll show the images next week.

The sky is clear, so I'm back onto straight photometry, though I may take an hour after midnight to image Comets Tsuchinshan and West-Hartley which I didn't get last night.

Stephen (23:57): I'm having another good night. I see cloud on the satellite shot, but as of midnight my signal-to-noise ratio is holding up. I've bagged two galaxies so far, [NGC 2903](#) in Leo and [M91](#) in Coma. If I get more it will just be frosting on the cake. So far tomorrow night's forecast looks good too!

Stephen (00:06): I think I spoke too

soon. My signal-to-noise ratio just went in the crapper! I'll stay up a while longer to see if it clears up, but I think this may be it for the night.

THU/FRI, MARCH 7/8

Stephen (02:06): It all started when I was late getting home from town. I was in a hurry to get the scope running and taking images. Then I had a problem with the camera connection. I just couldn't get it to stay connected. As well, my remote focuser wouldn't work. It's a 50 metre trek out to tweak the focus! I finally got everything working by midnight. It's a good thing that it's a long night!

Greg: Your determination is admirable. One hopes there were rewards for all the suffering. We had –20C and a stiff breeze here; I watched the stars play peek-a-boo with the clouds and decided I wasn't up for that level of pain.

Rose-Marie: The BigWetNose had me out there at 5:00 a.m. It was mostly clear but there was haze to the S and N. I was admiring the stars for only a short time because that nasty BREEZE quickly drove us both indoors and back into our warm nest. I don't recall a winter where there has been so much wind during the nights!

Cathy: We had some haze up here, was still hazy at about 3 a.m. although I could see stars, and still some haze when my alarm went at 7 a.m. The night before, we had the black fog...fog forming over the Ottawa River, with no backlighting so it appeared really black...just a wall of black from here over towards Québec. It was pretty freaky looking...

Stephen: I had my problems with wind here too later in the night. Guiding was pretty rough. The wind seems to catch the scope when I'm pointing at the zenith. I'll have to check my balance as well.

...Observing Reports: February–March

Kevin: A sky anomaly went overhead March 7th at 18:38:30 EST. Overhead towards the north, the dimmer object travelling west to east was an aircraft, a 777 flying from Toronto to Cairo at 31000' doing 515 knots. It was not the ISS; there were no heavens-above satellites in that time frame, no other aircraft on flightradar24.com, and no reports on the AMS site. In addition, it was not a standard meteor that starts dim, brightens up then fades. Any other observers? Any thoughts as to what else it might be?



Malcolm: military helicopter? I saw a Chinook flying a north south route over the 401/Odessa Enroute recently. Maybe a routine training exercise? Otherwise... Ultima Thule? Captain Marvel?

Kevin: Next time you are out, please check for me that all military aircraft with running lights have a strobing light as well. I checked the video closely and did not see any strobing light. I did see at the start what looked like two sources of light that merged into one, indicative of two spaced out lighting sources like on an aircraft, that appear to merge together as distance increases. I may have to add a sound recording to these events next! Also, what does and does not appear on flightradar24.com? I have seen military aircraft on it before and Ornge air ambulances, but not sure if military helicopters would show up or not.

Michael Bird: Radar coverage in the Kingston area is mediocre at lower

altitudes, to the point that overhead coverage is typically 2500–3000' so websites like flightradar24 and similar would not have data if an aircraft altitude is too low.

That evening there was flight training NW of the city (likely including Yarker area); it is possible that was what was recorded.

Kevin: Dang... I was starting to lean towards aircraft because of the 2nd light overhead...but still...no strobe?

Rick: I must say that my impression is that all aircraft are supposed to have strobes and thinking back all (or most of?) the aircraft I see at night have them. But I have sometimes caught aircraft in some of my images. You can separate the wingtip and fuselage lights but there is no sign of strobe. Maybe the images are just too small a field and the strobe occurs outside the frame.

You should calculate the angular rate of speed and see what that translates to in linear speed a various altitudes. My suspicion is that it might just be a satellite which isn't in the heavens-above database. Speed looks about right and I've seen a few of those. You might ask Mike Earl.

John Hurley: Not every aircraft shows up on these programs. Some companies pay a fee to not show up in these apps. And some planes flying VFR are not tracked by these either, only if they have an IFR flight plan on file. Many of these programs do run 5 to 10 minutes slow. Some time ago the Jazz flights into Kingston always showed two aircraft some distance apart, but the truth was there was only one plane, so don't trust the online sites too much.

Paul: The sky here (NE Kingston) was cloudless but very hazy early this morning; it was not really suitable for observing (bright sky background as if there were a Full Moon everywhere).

Kim: I was out getting images of the planets, turned around and the ISS

was coming through *Cassiopeia*, so after the 15s from the previous image was up, I turned the camera around to the ISS. It was a very long, and nice pass. (Taken with the Canon Powershot ELPH 120IS. The first was 8 seconds, and the rest were 15 seconds.)



Malcolm: What wait...when was this? Was Crew Dragon there too?

Kim: I was out at 5:24 a.m., so it would have undocked according to the times. They sealed the dragon at 00:39 p.m. Undocking occurred at 02:31 EST; the de-orbit burn was at 07:53 EST and splashdown was at 08:45 EST. Kevin said that he saw someone had caught the Crew Dragon in an image.

FRI/SAT, MARCH 8/9

Stephen (21:54): My equipment is cooperating tonight. I have my first target in the bag and I'm on to the next one. March weather is certainly a lot better than January and February were. I'll have a good set of photos for our next meeting.

Malcolm (08:49): Wow! What a night. It was perfect! Images of *Leo Trio* are processing now (Deepsky Stacker) and I don't give a hoot if they turn out or not. It was so clear, crisp, and dark last night. And the morning, glorious! Lovely frost everywhere. What a day today is. Best Saturday in MONTHS. Enjoy it while you can friends...I'm sure you've heard it's all going south tonight.

...Observing Reports: February–March

Stephen: I did the [Leo Trio](#) last night as well! Maybe we can compare shots at the meeting. I had a great night too. Everything worked as it was supposed to.

Rick: And I, of course, have a bunch of boring and unattractive science images. Unattractive because the tracking/guiding last night was awful most of the night. Not sure what was going on. However, the past two nights I have done some shooting of [asteroids](#) in the attempt to get a Minor Planet Center observer code. I'm on the RASC remote telescope science team and we're going to do the same for it so I wanted a better idea of the process, what kind of images/exposures are needed and issues that might arise. So the images do show the asteroid bipping and bopping across the frame which is kind of cool.

So, 5 all nighters in a row! Only the second time in my career. I'm hoping to get a few hours this evening before things go pear-shaped. That will make my first-ever 6 nights in a row series and observing session number 27 for the year.

Kevin: I've been getting images of local [asteroids](#) Dickinson, Levy, Martinduncan and Queen's from the Twitterscope at SMUBGOSB. I'm still working on getting two sets of images only a few days apart for comparison—almost always I get one set, then it gets cloudy for a week or two, and it is a different starfield.

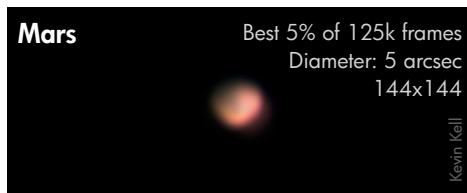
Here at SCGO things were not so good. The video finder could not achieve focus, pulled the eye-piece, still no focus. I'll work on that problem later in daylight. So I used the Telrad (yay Telrad!) to get the [Moon](#) in, synched, and then headed to [Mars](#). I used the Telrad to find it as well. Not too bad.

The laptop running the ZWO ASI290MC camera has a 120GB SSD with 75GB free. I ran a 30s with no FireCapture auto-align, as a

benchmark for seeing, then a 30s with FireCapture auto-align, along with the remainder of runs as well. Then 3 runs of 120s and 3 runs of 300s...and then ran out of drive space—even while in the background moving files off the laptop and into the house. Wow. The 30s runs were 1.6GB each. The 120s runs were 7GB each, and the 300s runs were 17GB each. Zowie! Today the laptop comes in for surgery, upgrading the 120GB SSD to a 480GB SSD. That should give me a lot more breathing space.

The runs generated: 14k frames in 30s with exposures of 1ms, 50k frames in 120s with exposures under 1ms, and 125k frames in 300s with exposures under 1ms.

The executive summary of it all is that it was bad (seeing was poor here). The best image of [Mars](#) is this one, processed in PIPP, AutoStakkert! and Registax wavelets. Mars is only 5 arcseconds big, the image is 144x144 pixels.



Rick: Seeing here was crap too. I have to manually refocus the Boltwood 40cm using the hand paddle (until I get the software written to control it remotely) and I could shift the focuser in and out by 8 or 10 steps without making any noticeable difference to the 1s focus images. In good seeing one or at most two steps makes a noticeable difference (it only has 0.001" resolution.) Guiding was also appallingly bad for many images. Isn't there a site somewhere that gives the view of Mars features at any given time? It would be interesting to compare my images from January against what should have been on the disk to see if any of it was real.

Daytime Stars

(from the RASCals list)

Mark K: Sirius, Vega and Capella, while by no means easy, can be viewed without a telescope if the conditions are right. Sirius because it is so bright, follow it out of the twilight sky into the daytime. If you lose it, you may never find it again. Vega and Capella because they are bright and pass nearly straight overhead. The trick is to focus your eyes at infinity, not an easy task. Naturally your eyes focus at minimum dangerous predator distance, about three to five metres.

As for planets, all the way out to Saturn and into Venus can be spotted. I remember vividly the evening of 1994-07-16 and pointing out an easy naked eye Jupiter 3.5° north of the Moon to all our dinner guests while we were eating our meal in anticipation of an exciting evening of observing Jupiter. Focus on the Moon and Jupiter was right there.

As for with a scope, I have not found it necessary to have the stars in the polarizing band to see down to the dimmest stars (in the Bob Garrison list of the brightest stars) down to 3.55 (well, at least those in the northern sky) as long as the telescope is polar aligned, in perfect focus and the sky is very clear. The Galilean satellites are also visible as long as the sky is not hazy. As long as the telescope is in focus, I can sweep up Vega or Capella.

If you can do this, you can do a very good polar align at a remote site as long as you put the telescope down reasonably pointing north and at the correct altitude. Since I have not had to do this task for a large number of years, (my scope is always polar aligned, a blessing) I wager I would be a bit rusty at doing the alignment, but I routinely start an observing session at the end of the day finding stars to get ECU, DSC and the setting circles all up and running before the Sun sets. Then it usually clouds over.

▶ Calgary Centre has a great page on this topic: calgary.rasc.ca/daystars/index.htm

▶ Tenho Tuomi (Saskatoon Centre) recommends using a rotating polarizing filter to help see stars in the daytime.

Hank: Try astronomynow.com/mars
Randy Boddom (on RASCals list): Hey, did anyone happen to see a

...Observing Reports: February–March

fireball at around 21:15 EST. From just west of Brighton it appeared to be heading SE slowly and lasted about 6–8 seconds.

Kevin: Upon inspection this afternoon, we did catch the beginning of this event. Another fireball captured on the AllSky2 camera system, first reported by a local astronomer in a hot tub! We captured only the first 4 seconds of the event as it passed beyond the image frame edge. This was seen by others and reported to the American Meteor Society. To the lower right is Orion with Betelgeuse and Rigel, Sirius, and moving upward Procyon, Pollux and Castor. The fireball is at the bottom.



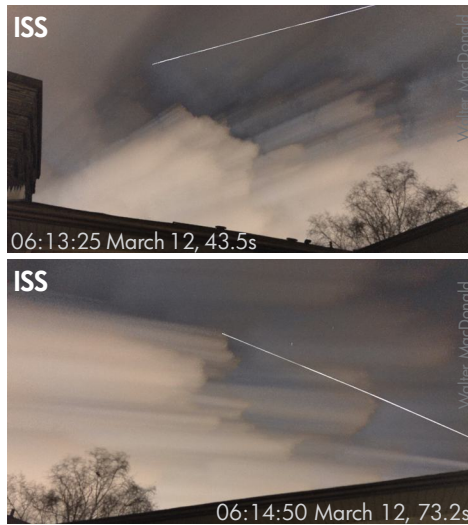
Stephen: I got some good images last night. Accidentally took two of M65 instead of M65 and M66. I'll have to pick up M66 on the next clear night. I went after a faint nebula, NGC 1931 in Auriga. Unfortunately I left it too late in the season and too late at night so it was low in the west and I only got two frames done. I might try it again earlier in the evening next time.

MON/TUE, MARCH 11/12

Walter: CSC was wrong again—it called for a clear sky from 2 a.m. onwards. It was still too cloudy to see the low pass of ISS at 04:38 (clear spots were in the wrong place at the appointed time), but I got a few time exposures of the one just after 6 a.m. There was still lots of billowy cloud around and it was really moving. I saw a very bright satellite moving

from S to N and then realized that it was actually Vega and it was the clouds that were in motion. A couple of times I was able to briefly see the complete Summer Triangle.

My camera aiming was not very good at this very early time of day (particularly in the absence of visible constellations), but the clouds came out really cool in the time exposures. (I didn't put the phone in airplane mode: I figured nobody would call me at that time of day, and I was right!)



Hank: Yes very cool cloud, nice image.

Paul: Neat shot. It looks like a water colour to me—with fewer colours than usual!

SATURDAY, MARCH 9

Rick (14:37): Oops, just looked at the satellite image loop—no observing this evening. The system is quite close and coming at us like a train.

Malcolm (15:48): Sky is already white here...

Rick (15:49): And becoming so here. Though still thin enough to image through. But we have another 2½ hours before any sort of darkness. I may yet try to pull off something minor in twilight.

Rick (20:41): Well, it's getting pretty thick out there but I'm still getting acceptable S/N for my target star so

I'll keep going for a little while.

TUE/WED, MARCH 12/13

Stephen (01:29): Not a bad night so far. I figured when my signal-to-noise ratio deteriorated that we had some cloud. So I looked at the satellite shot and sure enough there were some cirrus clouds passing over. But at least the Moon has set. I'm going after a few faint galaxies tonight. There is still a lot of dark and clear sky to come tonight.

Rick (02:03): Hi Steve. Good to hear you're up and at it like me. I've been shooting a mixed bag tonight—started with a few quick exposures of NGC 2392 while waiting for the end of astronomical twilight (since my first official target is too faint to start during nautical twilight like I usually do), did some photometry of AW Lyn, then shot a couple of very faint asteroids (6115 Martinduncan and 5272 Dickinson at Kevin's suggestion), photometry of QYUMa and UUUMa, then I'll move on to two possible gamma-ray burst afterglows. I'll finish off with some photometry of NN Boo then quit 10 or 15 minutes into nautical twilight.

It's been a great night so far, many images are FWHM less than 2 arcsec, even the 400s ones. And fortunately the cloud is going by while I'm imaging some of my brighter targets.

Malcolm (06:19): I was at it, but not up like you. I set up a time lapse sequence and let it run all night. Just had a look at the camera to ensure that it's still running and all seems well. The number one rule in time lapse is don't interrupt a sequence just to see if it's going well! I will report on my efforts either way at the meeting.

Walter: Clouds foiled another attempt to image an ISS transit. On the upside, I found a new hobby: imaging clouds! Why didn't I think of this before? It is so much easier

...Observing Reports: February–March

than trying to image in the ever-so-rare clear skies. And who needs any stinking aurora? Doing a time exposure of fast-moving clouds gives the same effect. (Admittedly there is less colour, but that is one of the things PhotoShop is for, right?)



Kevin: We both went out last night to do some observing and imaging. It was not freezing cold but there was a good wind. The roof of SCGO is binding slightly and requires a little push to start opening and a good push to securely close it. More to look at in the spring.

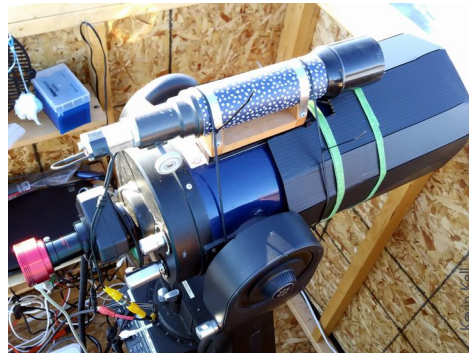
Kim is re-arranging her imaging setup with power and network moved around a bit inside. In the end, the mount internal battery was low and the session came to an end. You can only recharge the Ioptron battery above 0C.

Out in Serenity, I removed the Telrad and the Meade finder from the LX-200 and added the “Wagner-finderscope,” a nice little scope purchased from Rick some time back. It is the only small scope we have with a focuser, which I needed for the new finder-video camera. It was temporarily attached with zip ties sitting on top of the Telrad mount. The finder has a good amount of focus, but in the end, not quite enough. It came up short: ½–1" or so. The good news is that the video camera works! The field of view was just a little over ½°: the whole Moon was visible. Perfect! I also installed the 2x Antares barlow, taking the system to f/20.

I did some focusing and then took a few imaging runs of the Moon craters Hercules, Atlas and Endymion. Tried some slewing and synching with mixed results, getting the scope “lost.” Attempts to remedy this failed. OK, time to call it a night—freezing hands, and coyotes coming closer.

This morning we ordered some extension tubes, 1¼" size and 2" long. That should get the finder in focus! That and replace the ties holding the finder down with something better (not sure what yet). Velcro tends to work but gives a bit back after you tighten and release it. Also FireCapture lost the camera connection a lot. I’m not sure why—loose cables?

Did I mention the serenity observatory up on blocks is surround by water? Enough snow and ice and melt happened that I was standing in a large pond reaching inside to work. That’s got to be addressed as well: dirt and/or gravel are coming in this spring!



Hank: Kevin, I think you enjoy the chase just as much as you do the capture. You will never be bored in retirement.

TUESDAY, MARCH 19

Kevin: Greetings to AR2735, sunspot *du jour* (actually, *du* Monday). It popped up and was an easy-to-see spot for me (Kim did not even have to point it out!) yesterday down on the beach. Seeing and transparency I

Sci-Fi Novels with Impact

(from the RASCals list)

Curt Nason: I am reading a collection of science fiction short stories and one I read yesterday caught my fancy. It was *The Planetoid of Doom* by Morrison Colladay, concerning a planetoid estimated to be 5–10 miles wide that impacted in the Gulf of Mexico between Yucatan and the mouth of the Mississippi River. The ensuing tsunami drowned much of the southern USA. Further lives were lost to giant morays, sea snakes and T-Rex critters that were speculated to have been living undetected in the deeps. The story was first published in Gernsback’s *Wonder Stories* in 1932. As an aside, I wonder if the title inspired Arthur Byron Cover to write *The Platypus of Doom*.

Patrick Kelly: Two more modern SF novels that involve impacts are *Lucifer’s Hammer* (1977) and *Footfall* (1985) both by Larry Niven and Jerry Pournelle (1985). Niven is likely best known for his “Known Space” series which includes *Ringworld*, the winner of both the 1971 Nebula Award and Hugo Award.

Peter Tattersall: While *Lucifer’s Hammer* is about a major impact and its aftermath, *Footfall* concerns itself with an interstellar invasion, albeit one which involves the use of kinetic energy weapons (directing small asteroids to impact). Another novel in which kinetic energy weapons are used is Heinlein’s *The Moon is a Harsh Mistress*, where lunar rocks launched by rail-guns are used as part of a lunar revolt to throw off an earth-based Lunar Authority.

Kinetic energy weapons, including so-called ‘smart pebbles,’ are not uncommon in stories of future warfare using space-to-ground weapons. For a space-based civilization they are relatively inexpensive and are ‘cleaner’ and more scalable than nuclear weapons.

In fantasy, Greg Keyes’ tetralogy, *The Age of Unreason* (published 1998–2001) during the course of which Halley’s Comet is ‘called’ to strike London by the French, who, manipulated by so-called angels, did not comprehend the scale of the disaster which would ensue. There are also a number of alternate-history scenarios where no dinosaur-killer hit the earth and intelligent dinosaurs survive into the present day (and yet, some-how, humans manage to evolve!).

...Observing Reports: February–March

thought were much better than average.

Hank: Yes and it now has a partner being the active one today. [AR2736 exploded on March 20th at 1118 UT, producing a C4-class solar flare that lasted for over an hour.]

Stephen: I did some much needed maintenance on the telescope today. First off my remote focuser had stopped working. It turned out to be a loose clutch. My on-axis guider produced infrared reflections of bright stars so I installed an infrared filter on the main camera. I had dust in the camera producing annoying dust bunnies. I had been using flat files to eliminate those from my photos. But I noticed that the flat



Kim: Kevin and I went to Cobourg on Sunday, March 24th to catch the 2:00 pm matinee. The Firehall Theatre is a smallish theatre, but you are very close to the stage.

The play is about Henrietta Swan Leavitt, Annie Jump Cannon and Williamina Fleming. All were computers at Harvard University. Without giving too much away, it was a play about the discoveries of Cepheid pulsating variables, and the trials and tribulations of the time.

It was a very good production, well worth going to see it either at night or at the Matinees. The actors were very enthusiastic in the roles, and brought the characters personalities out. It was a humorous play. It runs from March 22, 23, 24 (matinee), 29, 30, 31 (matinee), April 4, 5, 6, 7 (matinee). You can purchase tickets online.

We both love live theatre and enjoyed it. There were members of the Peterborough Astronomical Association, and the RASC Kingston Centre in attendance.



files introduced more noise in the photos. So after many attempts I eliminated the dust from the system. It will remain dust free as long as I don't open the camera. The filter changed my focus, so I spent an hour carefully focusing both cameras.

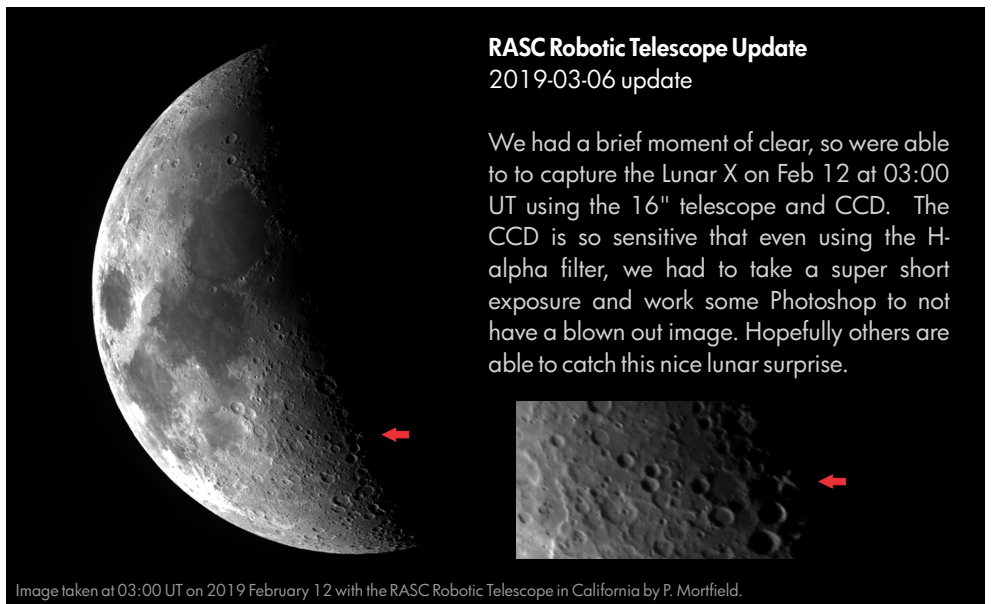
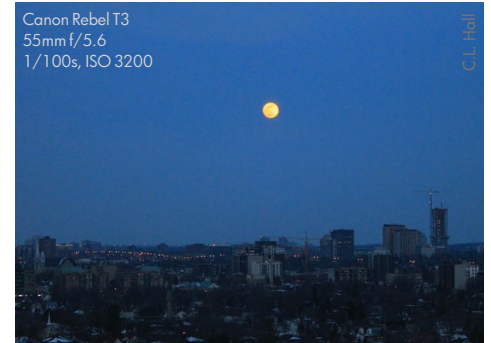
I can't take good images of faint objects with a Full Moon in the sky. So this evening I'm taking a fresh set of dark calibration files in honour of warmer spring conditions. Now I'm all ready for the next clear moonless sky!

WEDNESDAY, MARCH 20

Stephen: The Moon is too big to fit in my camera's field of view, so I took multiple images and combined them with Image Composite Editor. It worked out very well. I'll use this sometime to take images of large DSOs.

Rick: Holy Cow! What an idea! Instead of always complaining about the Moon take pictures of it! I may even give that a try. Nice result Steve.

Cathy: Happy spring! Attached is a photo of the Moon rising over southeast Ottawa tonight, about 7:30 p.m. It was pale orange rising; the streetlights are on Carling Avenue. Just a handheld shot from my balcony, but sure nice to see the temps warming up, and the snow starting to disappear. I darkened it a

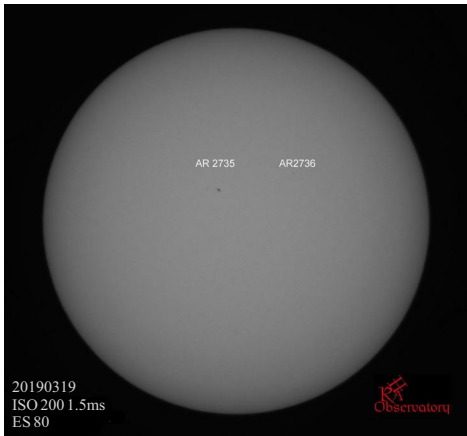


...Observing Reports: February–March

bit in Adobe Elements so I could see the face in the Moon...

SATURDAY, MARCH 23

Hank (10:21): When I checked the filter today on the Mak before packing it all up, [AR2736](#) was very near the west limb and would not make a good image after these days of gloom and doom we just passed through. I managed an image on the 19th but it was a mere speck then.



Hank (16:40): OK, after checking the filter with the Mak and it staying clear I decided to give it a try with the ES80. Wow, what a difference from what I wrote earlier. The refractor is so much sharper and the contrast even showed the plage. I guess my “would not make a good image” comment was WRONG!



Kim: The Solar Skreen gives excellent results, but make sure you have a case for it as it will damage easily. Mine has water spots on the

front but they do not affect the image quality.

Rose-Marie: I’m sewing up a “quick hang-up panel” for my kitchen window, the one at the sink that faces west. In spring and fall the Sun is *right* in my eyes that time of day when I’m washing the dishes, irritates me greatly. It’s not a good window to put up blinds, so I’m having to wing it with another solution.

Mark K: Now here is a solution. Put the Baader filter sheet on the window, then you can look at the Sun and do dishes at the same time!

Hank: I remember Norm a decade ago buying and selling refractors looking for the perfect one and thinking he was crazy, but I am now so glad I bought one. I am only keeping the Mak as a travel scope for now.

Paul: Beautiful last glimpse, wasn’t it? I agree about refractors, I used mine to look at this AR group this morning, and the views are so *crisp*!

I had thought that pinholes in solar filters were no big deal? I was vaguely thinking about making a filter for my 9.25" Celestron, but if the film does degrade like that I’m not sure it’s worth the trouble. I probably wouldn’t use it even if I had one. There! Good. Talked myself out of it. ★



...Trifecta

which could detect and distinguish the three types. So not only did it solve the solar neutrino problem but also proved that the neutrino has a mass (they can’t oscillate or change type unless they have mass.) Hence the Nobel prize.

3. Finally we (Laurie, Kim and Kevin, John and Peggy, and I) did the *Astronomy on Tap* which was great fun and a great success. **Dr. Mark Richardson** (McDonald Institute’s new Education and Outreach Officer) did a terrific job as MC. There were several quizzes (the Kingston Centre table won the big trivia contest, as how embarrassing would it have been not to?), an art contest, handouts, and professors and grad students wandered about answering questions and talking with the ~90 people who showed up. **Stephane Courteau**, **Katie Mack** and **Kristine Spekkens** each gave a short presentation about what it means to be an astronomer and what do they do. The first person to ask each presenter a question also won a prize. The food and beer were great, the company even better. Mark even gave me a couple of minutes to talk about the Kingston Centre and advertise our website and meetings. I’ve already talked with Mark and we’ll be involved in future Astronomies on Tap. They’re hoping to do them possibly as often as every 6–8 weeks. ★