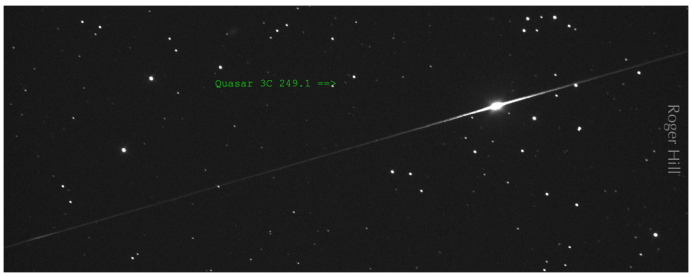
Skyletter
April 2021
RASC Kingston Centre



Roger Hill

Pleiades Stacking Experiment

Susan (April 1): The stacked image is 23x¼ second photos, ISO 25600, at f/22 with a 250mm lens.

JPEGs were stacked, converted to a TIF, then returned to a JPEG with GIMP. With such a short exposure on this subject my results are as expected where 23 stacked look a lot like 1 original.

Now that we are moving into weather that has less risk of frostbite, I should be able to track soon and add to the fun experimentation.

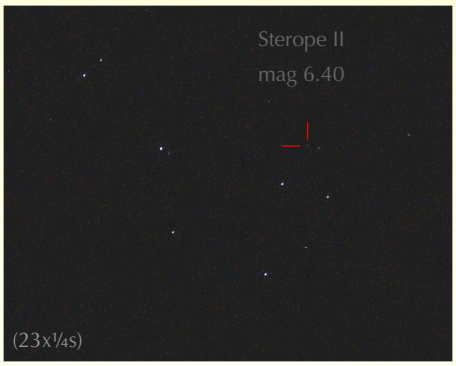
Malcolm: Do you have to shoot at f/22? If you can, try opening up the aperture so you will get more light falling on the sensor. Try a smaller number, as small as you can go, like f/4.5 or whatever that number is.

Looking forward to more pics from you—the pressure's on, lol.

Rick: And you should be able to shoot longer exposures—try 1s or even 2s to see how much trailing you can tolerate. And you can shoot more exposures—go for 60 or more—as long as the stars don't move far enough over the whole sequence to make a huge difference in your framing.

What format are you shooting in? RAW, JPEG? Ideally you should shoot RAW but for playing around you can probably get away with JPEGs. Are you using a cable release? I notice that your stack seems to show out–of–round stars which I think might be from camera jiggle. Even the longer exposures may help with that since

Susan Gagnon — M45 (both)



less of the exposure will be during the initial shutter–induced jiggle.

Kim: Is the camera in the eyepiece holder or hand–held at the eyepiece?

Susan: The camera was on a 'light' tripod, just the camera lens, no telescope involved.

I did not use the cable release for the Pleiades, but I did have a delay to let it settle down. As I said, I was using the lightest tripod I have. I used the cable release for the Moon and had the delay on.

It was more of an experiment, to gather a few shots of stuff to play with in the software.

Kim: Thanks. I know we are having some issues with our Dob and camera in the eyepiece but it is a matter of focus.

Keep up the experimenting. It's an interesting process but a lot of time at a computer screen.

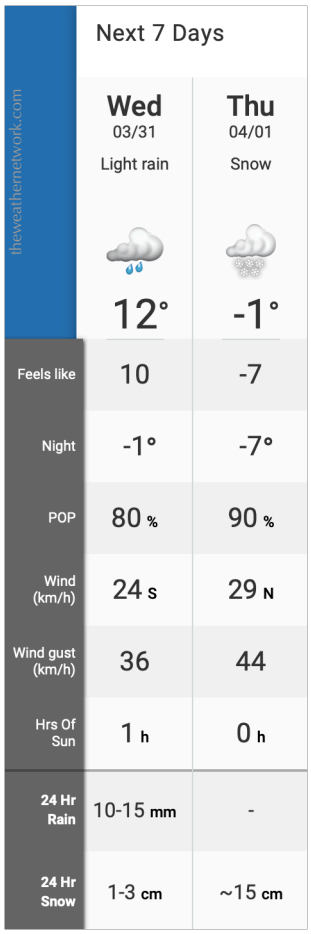
MarK: Dobsonians are optimized for visual use. Our Dobsonian (20cm f/6) will not reach focus with a camera when it is set up for visual use. I have a low profile helical focuser in it and it is optimized to have the minimum amount of stuff between the sky and the primary. The secondary is the absolute minimum size to fully illuminate an eyepiece and mounted offset on a single vane curved spider. In order to use a camera with this telescope, I have to remove the primary, mount three 5cm extension piers and move the primary mirror up the tube 5cm. Then I can focus a camera at prime. Needless to say, it has to be a special occasion for me to to it. (Like the 2004 Transit of Venus.)

Your mileage may vary. Your Dobsonian may not be so critically optimized, but in all likelihood, you cannot get your camera close enough to the tube to reach focus.

Rick: That's what the mini cameras are for. They are 1.25" diameter so you can just shove them down your focuser as far as is necessary to reach focus. The Boltwood scope is optimized to the point that even my main camera won't reach focus without the Paracorr in place and still I can put one of the mini cameras in the visual focusers and image at f/4.9. It's inconvenient though that they require a computer at the telescope.

I don't know why they don't make some of the other cameras 2" diameter instead of 2.25.★

Tuesday, March 30



Walter: I'm sensing an early April 1 prank here…

Thu/Fri, April 1/2

Stephen (21:07):
6 PM I looked at the sky and thought, "Na, this is just a sucker hole."
7 PM I looked at the sky and thought, "Could it be?"
8 PM I looked at the satellite shot and thought, "Yes!!!"
9 PM I'm on my first image.
For a cloudy night I'm amazed!
Stephen (22:51): Cloud de–veloping at 10:45 That may be it for the night. Oh well, not a bad run for a cloudy night.
Kim (06:22): Nice going Steve. The Sun came out after 6 p.m. and by 9:30 p.m. it was clear, but not very clear.

This morning, clear, as Saturn rises in the east and the Moon is heading west and is 20 days old. Very windy at –6C.
Rick (15:32): Yeah, I didn't shake the sucker hole idea until about 10, then took some time to get ready to go out, open up, and start my scripts only to find that my very first image was distinctly dimmed by the cloud that formed overhead while I wasn't looking. However, at that point I decided to stick with the sucker idea—this is just a sucker cloud and it will clear shortly. So I left things running and a few dozen images are probably not usable (though astrometry.net was able to solve all of them) but the rest should give me half–decent photometry.

Looking for better results tonight—I'll even be putting out the Sky90 to do some camera and exposure tests and some pretty picture stuff until moonrise. And I plan to shoot a galaxy or two with the Boltwood scope as well as my normal photometry. And it looks clear in California for much of the night so we'll be doing a science run there too. I'll have to get one of my Dobs out so I can claim to have had 4 scopes going at the same time.
Stephen (15:52): After it clouded over I looked at the satellite shots and decided that it wouldn't clear until after moonrise. So I packed it it. I figured the Moon was still a little too bright and close to where I wanted to image galaxies. We have a good string of nights coming. That will satisfy me.

Kevin: The International Space Station around 21:00 EDT [*below*]. This is a combined overnight star trail image with the bright streak from upper right to lower left being the ISS. It was a great overhead pass (mag –3.8) in clear skies with no Moon, as captured by the AllSky1pi camera system.

It is wonderful to stand outside and watch the Station and the Crew go by:

20:54:32 10° WNW
20:57:55 86° NNE
20:59:10 36° ESE

If you look closely you can also see a meteor trail [*arrowed*]. Also of interest are the various colours of different stars. Lastly, many star trails were interrupted due to passing cloud through the night.

Rick: I awoke this morning shortly after 5AM and lay there for a little while to try to go back to sleep. After about 15min I remembered

that I had planned to get up to see the reappearance of 44 Cap from behind Jupiter sometime shortly before 6. Rolling over to look out the window I could easily see (even with my glasses off) Jupiter gleaming on the horizon so I got up, dressed, and dragged the 20cm f/5.6 Dob out to my cliff–top observing site. It was a lovely morning though somewhat chilly at –7C and with a goodly breeze blowing from the north. Saturn and Jupiter were both very prominent in the SE, the waning Gibbous Moon to the south. I centred up Jupiter with the 8.8mm eyepiece (127X) to find a nearly featureless blob (slight darkening in the middle was all that could be seen of the belts) accompanied by three of the Galilean moons. The disk of Jupiter was colour-fringed from atmospheric dispersion and frequently wracked by very fast waves of turbulence which tore pieces off the upper and lower limbs, even occasionally breaking through the middle of the disk.

Somewhat daunted I continued my careful watch regardless. After several minutes I was able to distinguish Io having departed its transit of the disk, already well separated from the boiling disk. By about 6AM the seeing was occasionally moderately good for periods of up to 15s, the equatorial belts were nicely separated and their different widths and intensities obvious during these intervals.

I began to be aware of a fainter near twin to Io, closer to Jupiter and somewhat fainter (Stellarium says 44 Cap should be 0.5mag brighter than Io but that's not how it appeared). By about 6:10 I could no longer resolve the two 'stars' and they stayed that way, very slowly drifting away from Jupiter, until 6:25 when the Galilean moons were beginning to intermittently disappear in the brightening twilight so I gave up the effort and headed off for a very chilly pre–dawn bike ride.

So, occultation reappearance not really seen, but to watch the moon and the planet merge into a single object was very nice. To be out under the sky for an hour, to hear the first bird awaken to greet the dawn was lovely.

Blast from the Past

In 1989 I was able to watch Saturn occult 28 Sagittarii (with this same telescope.) The event took place higher in the sky so the seeing was better. Saturn has a much lower surface brightness than Jupiter, so 28 Sgr stood out much better and was easily visible winking in and out of view as it went behind density variations in the rings, sparkling especially brightly through Cassini's Gap and between the Crepe Ring and the disk. Finally as it disappeared behind the disk of the planet it throbbed in brightness every 2s, perhaps 4 or 5 times before finally dis–appearing. Very exciting.

Paul Boltwood, Rob Dick and Jon Buchanan from Ottawa imaged the whole event (with a movie camera if I recall correctly.) They spent days digitizing the frames, aligning each individual frame on the star, performing photometry on every image. The result was the first ever extreme resolution densitometry of the rings to something like km resolution. Completely ignored by the professionals. I don't know if the data even still exists.—*RW*

Hank: Very interesting report and a very worthwhile observation for someone as energetic as you Rick. It would be very nice to observe a star passing behind Saturn's rings, I might even get up for that.
Susan: Nice report and a nice observing experience. That is really what it is all about.
Kevin: Awesome effort, awesome story!

Friday, April 2

Kevin: We've been exchanging email about AllSky cameras and one question came up: what is our AllSky1pi limiting magnitude? So I grabbed an image from this morning at 01:05 EDT, about 15 minutes after moonrise but after the cloud cleared away. A simple non–enhanced look at stars around the Plough/Big Dipper showed a nice star at mag 5.25, 3 CVn, aka HIP60122, color index B-V of 1.61.

That was better than we expected, but then again, it does show the Milky Way nicely when it rises.

Fri/Sat, April 2/3

Malcolm (19:36): Nice ISS pass at 8:05 p.m. tonight.
Kim (20:19): Yes it was, we just came in.
Rick (20:43): I just happened to be heading out to one of the tele–scopes and that ISS pass caught my eye. I didn't know what it was, as I walked I was busy thinking about

what bright star could be over there (and hoping it might be a supernova). It was moving slowly enough that I finally had to stop and stand still to confirm that it was moving. I yelled to Jeanette to look out the kitchen window to see it but by the time I had finished speaking it had disappeared.

I shot a pair of videos of the pass a week ago and finally pro–cessed them—had to learn how to bulk convert Canon RAW to JPEG and then use FFmpeg to lump them into a video (much easier than VirtualDub). But I don't know how to share them. I think they're too big for the email list and my internet is too slow to try to show them on our social.

Malcolm (09:52): After the ISS passed last night, I got to work in the observatory. No rush, its not dark until 9:30 p.m. now.

Mars is in Taurus and passed near open cluster NGC 1746. I exchanged the CCD on my refractor for my Nikon D810a to shoot in one–shot colour. The field of view might have been better (a little wider) if I had shot in uncropped mode but the vignetting was severe. So I just made do. Guided with PHD2, Backyard Nikon for camera and mount control.

I'm using Cartes du Ciel now for my planetarium and I'm very happy with it.

Kevin: Very nice! Sharp! Mars lookin' good!

Malcolm: Thanks. I checked on astrometry.net and it reported that up is 267° E of N. There's no way I'm rotating either my image or my camera just so I can conform to the north–is–up convention. Who does that anyway? How does the effort required to conform make any sense?

Hank: Very nice, our old/new home maybe some day. I find the balance of objects in the image give it depth and overall make it pleasing even as the eye flips side to side between NGC and planet. Of course that may be because we have binge watched all but the last episode of season one of "Away."

Susan: Yes, sooooooooooo sharp.

I am happy to see this image. I am happy that you said it was in Taurus. I had not been keeping track of where Mars was and I was deeply disturbed that I'd never noticed how bright that star was... right where Mars was!

I am a big star-hopper and could not believe that I could have missed something like that especially since not long ago I was

looking at the open clusters in Taurus.

OK, next observing session—pack gloves, flashlight, BRAIN!

Dieter: Not to worry, Susan. Many moons ago Tom Bolton reported a nova to the Central Bureau of Astronomical Telegrams.

It turned out to be Mars!

And poor Tom had to award himself the annual award that he gave out each Christmas for the astronomical boner of the year.

May he rest in peace.

Susan: Good to know Dieter; this would not happen to me as I know my place...in the 'last to know' category.

Rose–Marie: I'm hoping no one remembers my hot pixel pics and me thinking something exciting had happened on Jupiter...about 12 years ago when I first joined. Thankfully I had asked and didn't blare it out to the world at large, lol.

Susan: A toe in the dark side! I'm GIMPed, PIPPed and stacked! But can I repeat it? Not for a few days.

Hank: Very nice! Can I post it to the FB page?

Mark D: Gimped pipped and stacked, that could be a movie.

Did you play around with the wavelets?

Kevin: It looks very good... can you talk about the optics when you post an image as well?

I have been doing some pro–cessing and nothing with that 500mm f/8 mirror lens comes close to your focus and sharpness. If I go back to putting the DSLR at prime focus, to achieve focus it needs the 2x Barlow (hmm, have not thought about a simple extension tube!) and then I do not get full disk.

Thanks for that! Extension tube coming up...oh wait...Full Moon is gone now...will have to wait another three weeks!

Susan: Hank—yes to FaceBook.

Mark: Wavelets, yes I played with them, minimally. I do not like how course and unnatural the image can get with too much

fiddling. It would be different if I was trying to accent one feature rather than the full–ish disk.

Kevin: Canon EOS Rebel T7i on a flimsy tripod, cable release with delay on shutter. Manual, did not use intervalometer. Collected in RAW and JPG.

For focus I used a Bhatinov mask on a bright star (max zoom on camera display to focus) then moved to the Moon.

15 photos taken in succession, JPGs added to PIPP to line up and these were saved as TIFFs, so moved to GIMP to convert back to JPEGs as I have limited exp with RegiStax and can make the JPEGs work. Stacked in RegiStax. Minimal wavelet adjustments.

I could not make Registax work so I uninstalled it and with a new download I left out the latest update. In my original download I thought I should be totally up to date on everything so I also downloaded the 6.1.0.8 update. When it did not work I checked what the update was doing/not doing and I saw a reference to 'previously saved gamma.' I think it says it solved this issue, I do not know if this was my issue. All I know is that it worked on the new download *sans* update.

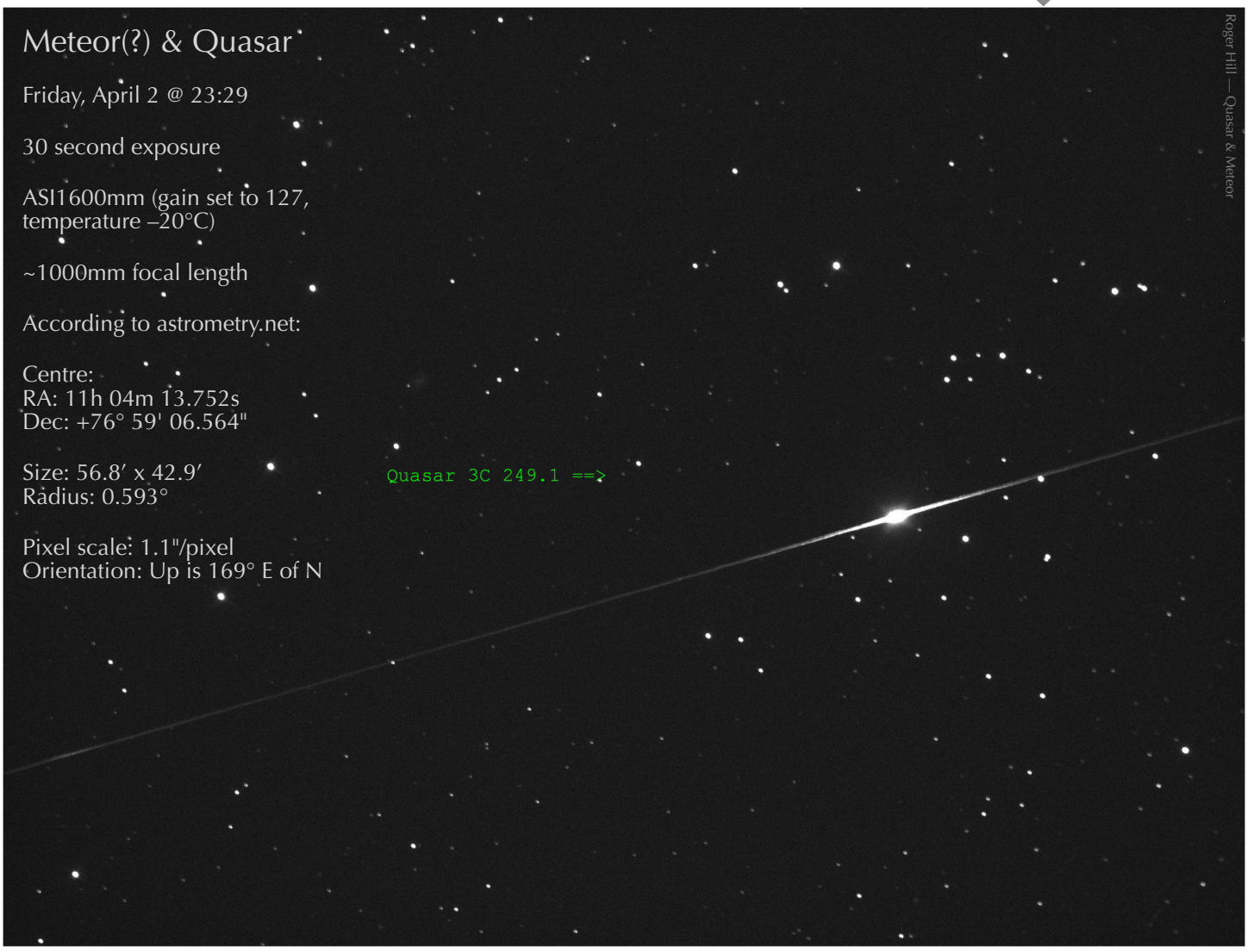
It may be a coinkydink. I may have just done something right that I did not do before. Time will tell if I ever have the urge to spend this much time on the computer again. Maybe I'll save a bunch of photos for the next pandemic.

Roger: I was checking the focus of my 6" RC, after I'd done a plate solve to put 3C 249.1 (a 15.7 mag quasar in Draco) into the centre of the frame, when a meteor went across the frame. Did anyone with an all–sky camera happen to catch this?

The meteor would have been above the pole, and just west of the meridian.

It nearly got away from me because the images taken for plate solving are only kept in a temporary folder. I was able to save it before it got overwritten because I was at the keyboard in my Observatory.

I think it might be time to set up an all–sky cam, though.



Kevin: AllSky1 @ SCGO did not capture anything in and around that time. It maxes out at a 60 second exposure and a single point does not move that much (*i.e.* no real star trails) so with an integration of that time, its limiting magnitude is about 5.25. With a moving object like a meteor, I have not figured out how to calculate or otherwise figure that number out.

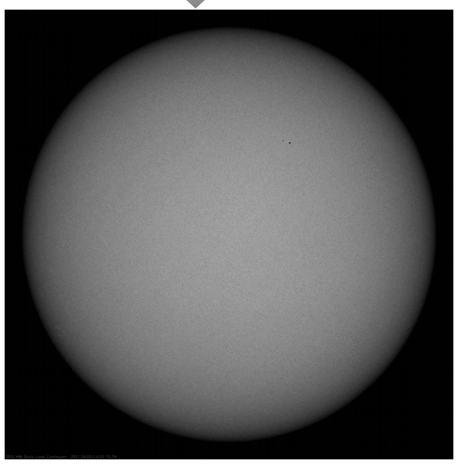
AllSky2 @scgo is designed to capture and report only fireballs (mag –6 and above, roughly) and did not see anything either.

Roger: A couple of friends have suggested that it looks more like a satellite glint, which did occur to me. However, I couldn't find anything on an admittedly quick search.

Stephen: That's a one in a million shot! Congratulations!

Saturday, April 3

Hank (11:34): YAY, new SUN–SPOT! SDO image, gotta get out there today!



Kim (11:40): I got it in white light and in H–alpha. There was an area that had some white plage with activity. Will process later.

Hank (13:14): Just finished, actual cloud now, did get the same abouts. Will process while watching the Jays, hoping for clear later.

Sat/Sun, April 3/4

Stephen (00:09): It's a nice night. The wind is calm, transparency is good, seeing is good. I've been imaging since the end of nautical twilight, picking up some nice spirals in Leo. Next I'm moving to Canes Venatici just for a change of view.

Cathy (00:59): Palomar [globular] is in Canes...I thought Canes rang a bell...finder chart at: cometchasing.skyhound.com/

Stephen (01:07): Palomar is mag. 12.3. I'm on some very interesting galaxies. I'll stick with them for tonight.

MarK (06:56): It was nice and calm last night. Cat ice on a good deal of the lake this morning.

Susan (13:56): It was a nice night at the scope last night. Did some variables, confirming a 13.5 mag star. I think I'll try to keep a record of what my faintest for a session is. The variable charts are great for this. I have to make a new list of stars for the spring. Some of my old ones are moving on.

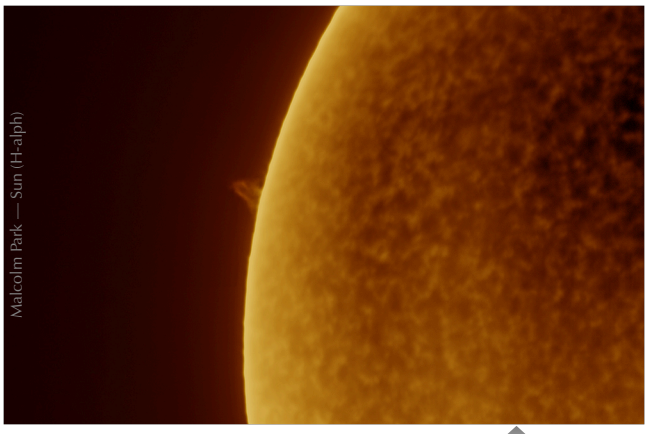
Sunday, April 4

Hank (14:13): I was out just past noon, clear powder blue ski, good seeing and a decent Sun. The sunspot might just as well be gone but I will take it just the same, there are a dozen small proms so I better get processing.

Rick: Oh, that's going to get MarK upset.

MarK: Thanks Hank. Nice of you to remind me that the ski hills are closed by government order, but golf courses are okay.

Hank: Ha, hahaha so funny, my mistake but a good one!



Malcolm (17:40): Solar 101. I present my first solar image. Learning the solar ropes. Focus requires something to focus on! But this is going to be fun.

20% of 1000 frames in each set were stacked. One set exposed for the disk, one set exposed for the prominence, both captured with SharpCap.

Don't ask the settings, I don't recall. I just fiddled with the exposure and gain. Balancing one off against the other, trying to keep the exposures as short as I could, and the noise as low as I could.

Autostakkert, PIPP, RegiStax and Photoshop were used for processing.

ZWOASI178, 3x Televue Barlow, Mark Kaye's Coronado 70mm with UV/IR blocking filter all piggy backed on my Mach–1.

What a difference that UV/IR filter makes. Couldn't focus at all without it.

I tried imaging the full disk but it was pointless as it wouldn't come to focus. At least with the prominence it gave me a target.

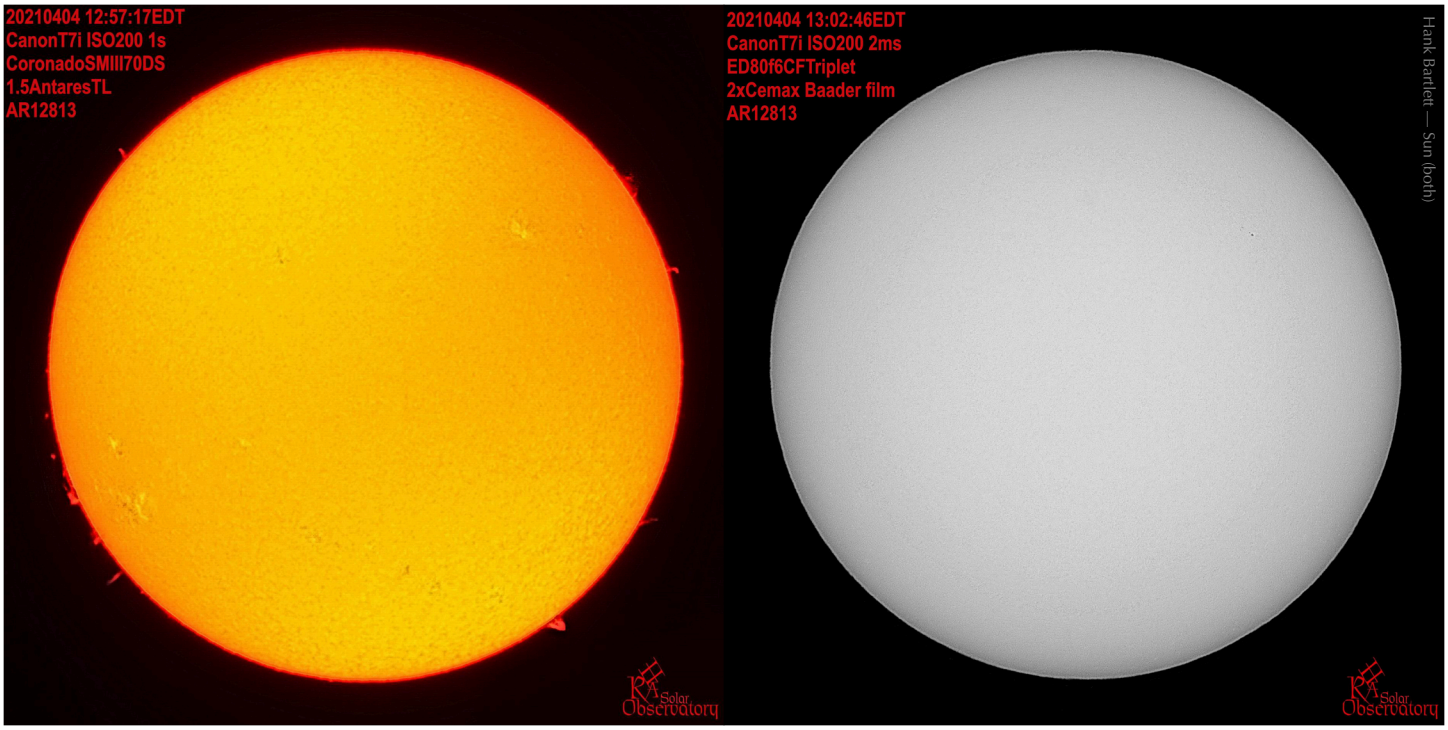
Mike: Looks good! It gives the feeling of being in close orbit.

Malcolm: Hehe. Standard orbit helmsman!

Kim: Nice capture. Is the Barlow to make it bigger? So you do get a full disk?

Malcolm: Thx, yes. With no Barlow I do get the full disk.

MarK: Wow, I did not realize that scope had that in it. Shows the



skill of the user.

Any idea why you could not focus a full disk?

Malcolm: Poor seeing and nothing to focus on (no sunspots)? My assumptions.

Hank (21:46): Just seeing these posts, nice image Malcolm! Yes there is/was at least a small sun–spot today, however in H-alpha the actual spots are not always discernible. It has been a busy Easter day and I have still not finished my H and white light images for today so I will post later.

Glad to see you got your hands on a scope and tried this, a vast difference from the 40mm. That said there are amazing images coming from PST with the right camera. Hope you have fun.

Malcolm: I did try my PST but I don't have the right nose piece for my camera so I'm off by about 5mm. Apparently the part I need was discontinued by ZWO years ago.

I did find something similar to it on eBay and ordered it, but it hasn't arrived yet. And then Mark offered the loaner!

Hank: That is great, maybe someone we know can make that nose piece for you if the similar doesn't work. The prom you imaged has grown and stretched some so it may be going for a release, a good time for a second session.

When I take the 40mm back in, eventually I would like to try triple stack if I can get the right adapter ring but that would not be until activity picks up a lot as that is when it makes the most difference.

Hank (23:02): I got my processing done and here are two resized images from today.

Sun/Mon, April 4/5

Stephen (22:04): Got started right at the end of twilight. I'm imaging a nice spiral, NGC 3810, in Leo.

I read that there is a supernova in NGC 3147 in Draco. I'll see if I can get it tonight. It should be a great night.

Stephen (01:18): I bagged supernova SN 2021hpr in NGC 3147. It looks great! I have a good comparison photo from last year. I'll post them tomorrow after I process them.

Michael B: General question for anyone in the group who has or does calculate their polar alignment error:

From my backyard in the city observatory I am unable to view Polaris due a neighbour's tree, however using the polar alignment functionality of my mount after aligning, my mount was initially showing an error of 10.2' S and 2.0' W. After a number of adjustments and re–alignments I was able to get the error to 1.36' N and 1.50' W.

How do these values compare with anyone who uses Sharpcap or similar? Out of curiosity, would these error values be problematic for short astrophotography exposures (1 or 2 minutes)?

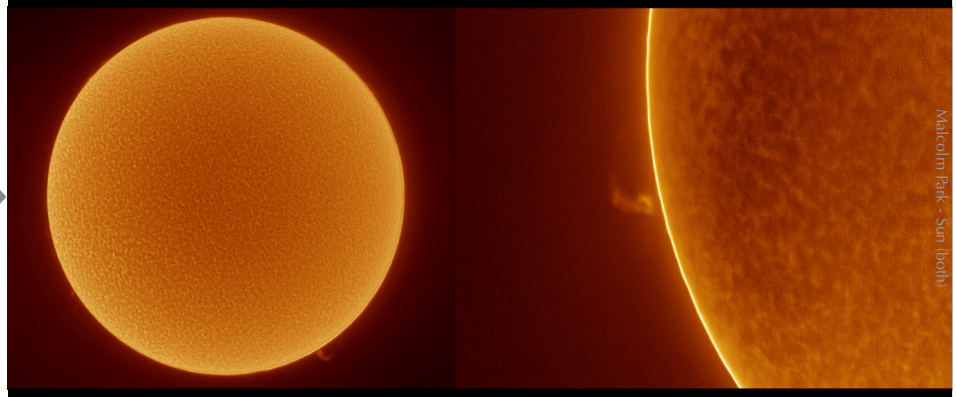
Rick: I think you'll find that is quite adequate, probably even for unguided exposures. Certainly good enough to give it a try and see if you need to improve it. Though honestly I think you'd be hard–pressed to get it much better than that.

Stephen (13:42): Last night I captured supernova SN 2021hpr in NGC 3147. Luckily I had a previous image on file.

Monday, April 5

Malcolm: Using the Gong image as a reference, I noticed that my image is being flipped 180° (assuming by the diagonal). So I flipped it, and rotated it in PS to match the view on Gong.

This one is 3x binned without Barlow. The prominence was shot with 3x Barlow and wasn't as sharp as yesterday's IMO. I dunno.

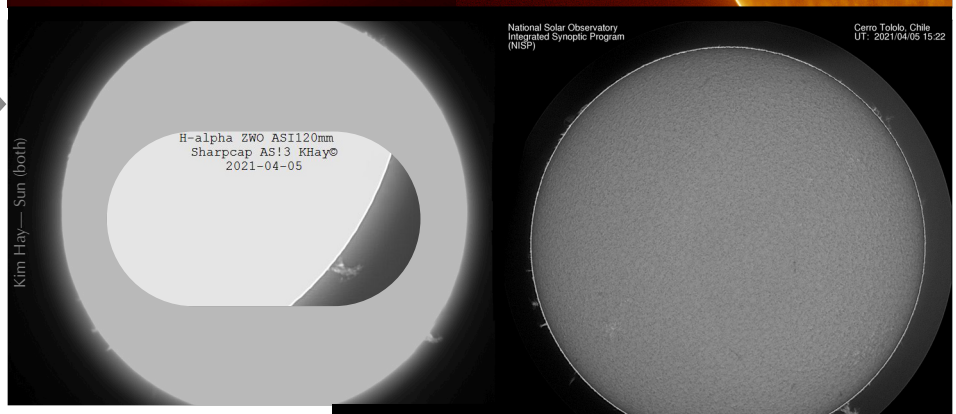


Looking forward to shooting the Moon at high magnification now.

Kim (16:03): In white light observing, there was no sunspot. However in H-alpha there were quite a few prominences. This is a close up on the large one on the SE of the Sun [*inset*] and the whole disk image (all that I can get with the ASI120MM mono camera).

The two images are the best 50% from 3 x 300 images using AutoStakkert!3

There is still a steep learning curve, but I did some experiments with one image run of 1000 frames and 3 x 300 frames. Large files with the 1000 frames, and I seemed to have some ghost imaging on the N quadrant (image not attached).



Hank (22:40): Keep at it Kim, getting better all the time. Sunspot AR 12813 is still there, but small. There are two smaller spots (maybe 12814) in the SE but I could not resolve them, but have seen them in others' images.

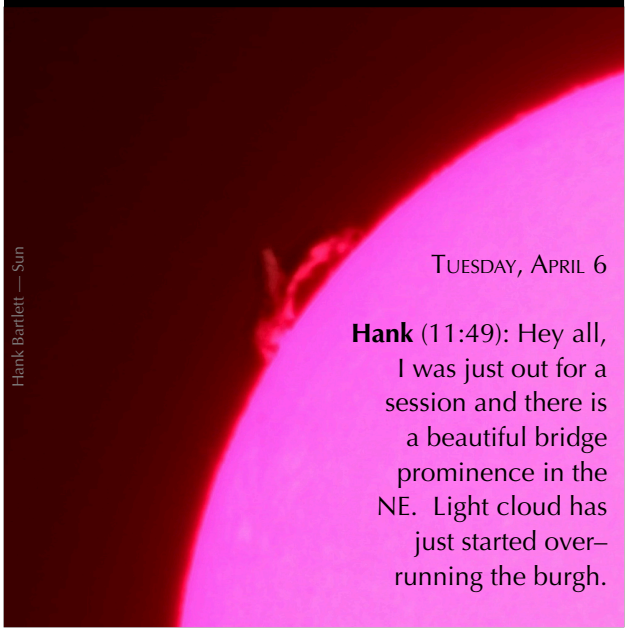
Malcolm (22:45): I found the difference between 1x and 3x bin file sizes significant (10x), but I was frustrated with the 3x image as a whole, being such low resolution. I see the reason you would want shorter AVI's though.

But so far its been a good learning experience. By the time there's some actual drama on the Sun I'll be ready.

Mon/Tue, April 5/6

Stephen (01:10): The supernova has brightened since last night. I'm doing another image run on it tonight. I'll see what I have tomorrow after processing.

Rick (12:26): With the before image you could try image subtraction and do photometry on the SN.



Tuesday, April 6

Hank (11:49): Hey all, I was just out for a session and there is a beautiful bridge prominence in the NE. Light cloud has just started over-running the burgh.

Wed/Thu, April 7/8

Stephen (22:38): It was a good meeting tonight, lots of interaction. The clouds cleared out right on schedule and I started imaging at the end of twilight. I'll pick up galaxies in Leo, Ursa Minor and Canes Venatici tonight. As well as another shot of the supernova to see if it has changed. It's a good night!
Rose–Marie (23:07): Well my sparklies are a no–show. I hate to waste a good clear night but I've been busy packing and moving stuff, just too tired to get out there.
Stephen (02:14): I just had a look at the preliminary image of NGC 3147. The supernova is visibly brighter than two nights ago! I'll have a better idea tomorrow after carefully processing the images. But it looks good so far!
Susan (11:14): I also had a good night. No winter coat!

One more night before we have to resort to other hobbies, or for some of you, time to process your images.

Thursday, April 8

MarK: In three years, there will be a total eclipse here on this date.

Today's forecast is for sunshine all day.
Malcolm: I'm going to guess that these are the kind of conditions we need for solar imaging!
Kim: If you are going for detail. You can get a scitillation meter that will project the best time for imaging.
Hank: You mean of course a *scintillation* meter, detector or counter?

Interesting idea, I checked the X-ray site and Gong multiple times a day. The best detector I have ever had was Kevin emailing "...there is an X1.6 flare NOW..."
Walter: I'm sure she did. It also helps if you don't post your images on *flickr*.

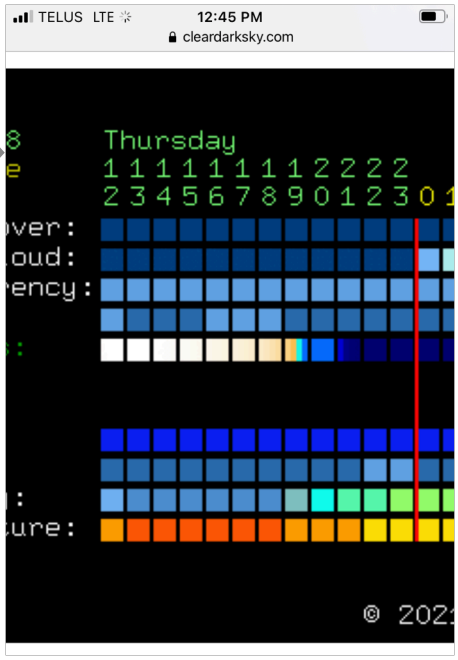
Anyways, I came for the *scintillating* conversation and stayed for—well, this…
MarK (17:12): 24.5C today. We live in interesting times.
Malcolm (18:29): 32C currently in the POD.

Thu/Fri, April 8/9

Stephen (23:34): I am currently imaging NGC 4208. This galaxy was discovered by astronomer William Herschel on April 8, 1784. So tonight is the anniversary of its discovery!
Hank (00:19): Good night to image it, I am sure you will do it justice. I am going to bed.
Malcolm (10:42): Yes it was a lovely night. I was out many times and the spring peepers and other frogs were making their music.

The warm weather was appreciated, but I had to settle for a measly –15C sensor temperature.

I spent all my time on the Leo Trio.
MarK: Yes, I was out in shorts until I packed it in. I did have to put a mosquito grenade into the Observatory. We killed too many



to count while we were eating out on the deck, so I took it as a precaution.
Susan: My observing was great. No bugs and no snow boots!

I took a break from the variables. I have one that has a 500+ day period so I'm pretty sure nothing happened.

I picked some stuff low in the sky and sat and sketched deep sky targets. Very relaxing.

Fri/Sat, April 9/10
Fatigue and Clouds

Stephen (16:44): I was very tired last night so I went to bed early. I probably missed out on a good night. Environment Canada says clear for tonight but the satellite shot says cirrus cloud. I'll wait and see how thick it is. The long range for Wednesday looks good.
Malcolm (17:04): Ya it was nice at 9:30 p.m. I resisted the urge to image and stuck to my plan to run darks and flats.
Rick (20:01): I was totally surprised to find it clearing off when I came out of the office after the Ottawa meeting last evening. So I cranked the scope open quick and got things running. I also had the remote scope running in California. Dead clear all night long—so much for their forecast. Got some really nice data from both scopes.

But, I too wimped out and went to bed. Every clear night the past 10 days I've had, I also had the refractor running at the cliff–top observing site. That's a pain because it isn't scripted so I'm out there every hour or two to change targets *etc.*, plus I've been shooting galaxies in the evening with the Boltwood scope, then switching to scripted photometry, then switch–ing to a cataclysmic variable then back to scripted photometry. Every switch involves going out to

Starlink

Malcolm (Mar 22): So... It's shipping in three days!
John: Congratulations, looking forward to your report.

Walter (Mar 30): Is it there yet? Is it there yet? Is it there yet?
Malcolm: Scheduled for delivery tomorrow before 8 p.m. I might have it up and running before the social.

Malcolm (Apr 5): Starlink has arrived. Speed is as advertised.

They are currently out of stock of their pole mount adapters. Delivery of that is expected to be in May. Until then it sits on the ground. After that it replaces the Xplornet antenna on the roof. No point drilling another mount when I can just re–use that one.
Roger: Excellent! We've also registered to get a Starlink system, but we were told that it will be mid to late 2021 before it will be delivered.

What sort of speeds are you getting? I heard about one person in BC getting speeds in excess of 500Mbps.
Malcolm: That's what I was told! And it arrived about a month later.

They may surprise you.
MarK: Tilt it a little flatter and it will make a wonderful birdbath.

Funny thing, I was just sitting down to fire off a note to you asking whether or not it had arrived yet.
Graeme: I too am waiting for one, fingers crossed as I could REALLY use the faster speed!

MarK (Apr 9): Xplornet must be feeling the heat. I just got and accepted a free upgrade to 25Mbps.
Malcolm: But can they deliver?
Graeme: Solid *no* here, we have 25Mbps and unless you are out 3–6 a.m. we barely get 5 on good days.
Malcolm: Sorry, rhetorical ques–tions aren't obvious in an email.
MarK: Hah! To put it mildly, I am not holding my breath. But I can dream...

I actually am not that stressed about the speed, it usually is *up to* what they said. We have a direct sight of the tower, but the continuity of service is bad. It drops out for a few seconds all the time and then any VPN connection is scuppered. That is what I wish they could improve the most.★

the observatory so I'm up at least once an hour all night.

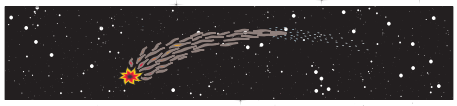
Last night I started my scripts on the Boltwood and remote scopes and went to bed until just before sunrise. Wonderful. Oh, I also ran a long series of bias and dark frames on my QHY183 camera in the office. Also while I slept.

On Monday and last Friday I was running the Boltwood scope, the refractor, the RASC Remote Telescope, and my 12.5" Dob all simultaneously. Got over 500 images each night plus my visual observing.

Tue/Wed, April 13/14

Stephen (00:18): Well, it cleared at 11:30 so I set up. Imaging galaxies in Coma. I'll have to see how long it lasts. At least it's something!
Malcolm (03:26): It's eerie out there. Thick ground fog but clear–ish overhead. Looked out at the Summer Triangle through the fog.
Stephen (03:47): The sky stayed clear long enough for me to finish my image run. There's not enough time for another one and sky conditions are deteriorating so I'm closing up for the night at 3:45. Not a bad run for a cloudy night!
Rose–Marie (07:36): Foggy this morning, I can't even see half way across the field. Mark K, what's your view like over the lake?

When I walked Kerrie at 11:00 p.m. it was nice and clear.
MarK (08:20): Lake, what Lake? Fog is thick here, there was hardly any view but white. It is clearing up now overhead, but still no lake.



Monday, April 19

Hank (11:12): What a beautiful solar morning! Proms, filaments, spots. If you haven't yet, get out there.
Kim (11:14): I have been out and imaging for over an hour now, fantastic day.
Malcolm (12:22): I did! I have data. Might go out again.
MarK (14:28): It is so kind of me to be sitting under clouds here in Gtown for you so that you can have nice sunny clear skies. I keep looking into the cams at home and seeing the bright light.
Keith (14:47): I have been out, even tried to take photos.

Tuesday, April 20

Hank (10:22): If there is any clear we need to get back out there

today. The filament in the SE has rotated longer and there are still good proms. Last night just before midnight UT there was an M1.1 flare generated by 2816. GONG Learmonth catches it just one vid frame before MAX and continues after that.

Sky is just clearing here but rather gusty.

Kim (10:29): Thanks Hank, we were getting live updates and were checking everything we had, but nothing received. Checked out the 211 Ångstrom Fe [SDO feed] and we had determined it was AR2816 from yesterday's viewing.

Hank (10:32): And now also a new AR/spot in the SE and too damn windy to trust opening the roof with 25km/h gusts. Still on a tripod, I may have to carry the scopes out in the wind shade of the building and catch some images.

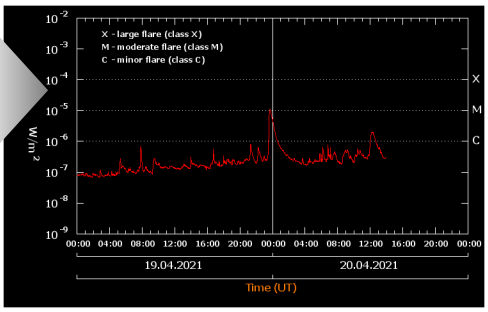
Susan (11:59): Saturday's observing showed such a blank disk I did not look!

Keith (12:24): The wind is not a problem here, just too much cloud to see anything.

Hank (12:43): I went out and blasted away 184 images during any openings in the clouds. Had a couple of good clear spots. Just settling in to weed out the best and process them.

Hank (12:52): Forgot to mention that once the front went through and the sky started to clear, the wind died down enough to be confident it would not lift anything. To be on the safe side I secured the roof once open, I wasn't afraid of the 25km/h gusts as much as the possibility of higher gusts with the type of cloud and all—it looked very ominous here for awhile. Cloud has taken over again and likely will stay that way through the SNOW STORM!?

Kim (13:18): I did white light and saw the new spot on the limb. Very windy; I will not open the



observatory, and for the next few days too cloudy. But I did manage to count the sunspots.

Hank (13:43): Kim, what is the 211 Ångstrom Fe? Did you pick up the eruption on your radio scope? There is so much activity that the X–ray is now baselining around $10^{-6.5}$.

Kim (13:57): Nothing on Radio Jove (directional) or on SuperSID; several days before we get that effect.

The Fe is one of the SDO readings. We went and looked at all the angstrom events and the 211 Fe XIV showed a very strong storm with temperatures of 2,000,000 K, hotter magnetic regions.

I was watching the H–alpha area in the north yesterday as it was white hot, so I was expecting it to flare, but it did not . No spots evident, but plage activity.

Spaceweather today has the 131 Ångstrom feed showing the 10 million Kelvin flaring regions.

Hank (15:09): Yes the excitement is building but may be short lived; X-ray is still spiking but the baseline is once again dropping a little. Sure would like to see the baseline stay above 10^{-7} for a while, like maybe 5 years or so.

Got good images today in spite of haze and working on them for tomorrow night. Did you notice at all (observing or GONG) the large ring of plage around 2017? It is very obvious in H-alpha and resembles the Manicouagan Crater in Quebec.

Wednesday, April 21

Kim (08:27): Just checking radiojove @ 20.1MHz... nothing there... It picks up realtime radio events, but only if the target is within the directional dipole beam.

Thu/Fri, April 22/23
Lyrid Meteor Shower

Kevin: This is one of only seven meteors captured overnight from the AllSky2–UWO10 camera system. The bright Moon certainly did not help.

Susan: Kevin, that would have been pretty nice without the Moon!

Did anyone see aurora? I thought that the sky looked a bit pink when I checked at bedtime but I had been using a bright light for embroidery on a bright blue fabric so that probably screwed up my colour perception.

It was a nice sky for con–stellation identification as only the brightest were visible. Polaris really stood out in its isolation.

Kevin: Kim & I were both out observing/imaging on Thursday evening from about 20:00–21:30 EDT.

I did not see anything even

remotely like aurora but then again I am not expecting any until Sunday, or more appropriately Rainday.

No aurora seen on AllSky1 video through the night.

Friday, April 23

John (14:20): Things are getting back to normal this afternoon: got the solar scope out but did not see very much; might be some very high haze or not much to see. Waiting to hear from Hank for the official word.

Hank (23:39): Yes John there was haze for sure, I could barely make out Venus. As for solar, both H-alpha and white light produced decent images.

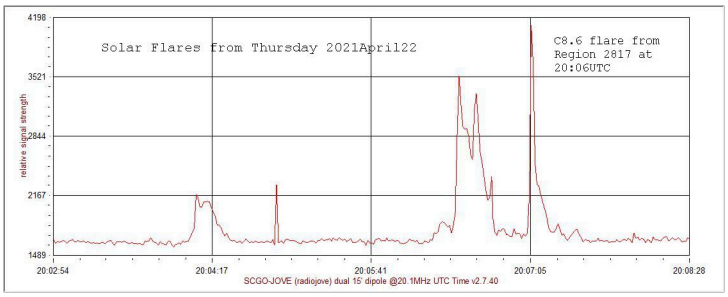
Kevin (08:43): It's solar flare season again! This note came from the Radiojove email list from John Avellone, Shenandoah Valley Virginia/West Virginia: "More solar activity @ 20MHz. Attached chart for 200330–200730 shows the RSP VI/1 bursts associated with a C8.5 XRA flare."

This prompted us to go back to our own Radiojove system and extract the graph below from roughly the same time frame. Yes! Confirmation again!

Since that analysis, we've increased the number of X and Y axis ticks to help more easily identify timings, and the master reference as to when and how big the flare was comes from spaceweatherlive.com/

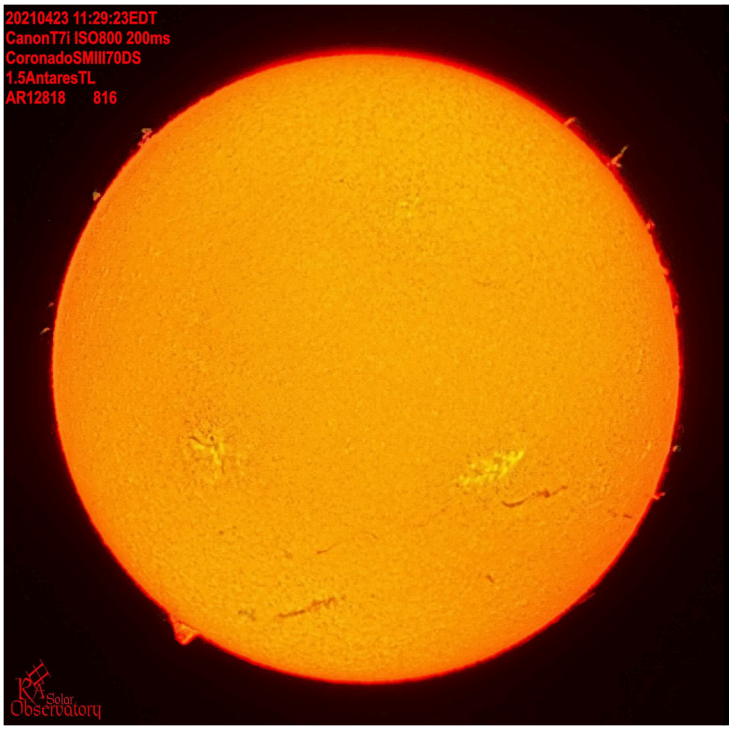
As another point of information, we have been trying to determine the beam width of the dual dipole antenna. This flare helps. At 20:06 UTC = 16:06 EDT the Sun's azimuth was 244°, which is 244° – 180° = 64° west of south. Symmetrically this should mean the dipole beam is at least 64° x 2 = 128° wide.

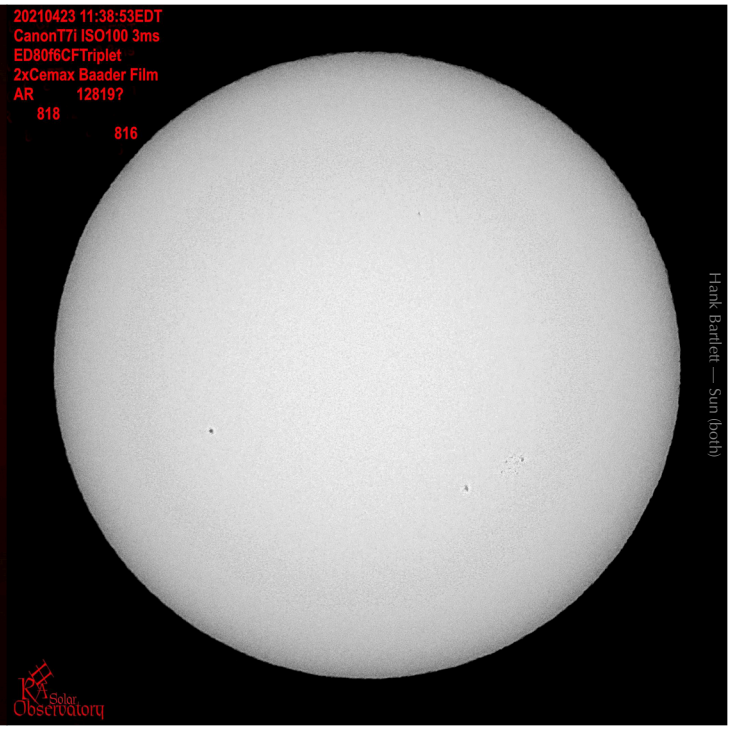
Hank (12:20): YES! There have so far been 15 C class flares since 04:35UT yesterday and do not forget the M1.1 on the 19th! Yesterday was the most active day of cycle 25 so far; today has calmed down but still appears to be holding a baseline of about $10^{-6.6}$ X-ray.



Rick (14:07): I was out for about an hour this morning looking and imaging with Hank's 40mm Coronado. The looking was very good: one really nice broad prom and several smaller ones, a sunspot, one really big filament and several smaller ones, couple of active areas. Seeing visually seemed quite good, assuming the scope is f/10 I'm looking at 45X. Anything more seems to make the image too dim and doesn't improve detail.

The imaging was not so good. Achieving focus seems very difficult, the image looks very grainy and low contrast. Seeing looks quite poor. However, I will process the SERs and see what can be retrieved. I





am shooting 2ms exposures and gain ~22 for the disk—this keeps the histogram peak at about 95%. For prominences I bump that to 4ms and gain in the mid 30s which blows the disk out. I tried shooting a few SERs with a 1.8x Barlow but honestly I think it just magnifies the blurriness.

I tried two different laptops and both get very slow frame rates, ~4fps for the little laptop/notebook (admittedly saving to an SD card which is my 'hard drive' for that computer) and 6–7fps for the bigger laptop (Dell i5, 8GB RAM, 1TB HDD). Now, I am using a much larger ROI of ~1900px square *vs* the couple hundred for a planet and it is a colour camera (don't know if that makes it slower but it does make it less sensitive and the true resolution is lower). The camera is a QHY178 colour, using FireCapture software.

Hank (23:36): Glad you got out, I would really like to see some results with these higher end cameras. It was a decent morning, downsized DSLR image attached.

Kevin: I can see that in the very near future I will stop even looking at C class flares and only mention the M class and higher!

Kevin: 1) Do *not* use the latest beta versions of FireCapture...there are serious FPS issues where people are reporting much slower rates.

2) Spinning drive in the laptop? Clone it to an SSD. SD cards are *slow*. External USB is *slow*.

Rick: I don't know if I'm even using the latest version of FireCapture—I'm running 2.6.08 but their website only says 2.6, no reference to the minor version. Certainly not a beta—things are hard enough to get working without fighting against possible bugs too.

I know that all my drives are slow, but the notebook has no provision for replacement of the 'drive' (it's MMC memory, probably on the MB) and the 'big' laptop is rather old and fractious (the connection to the display is flaky and it's Win7 which some software doesn't support) so I would like to replace it sometime fairly soon so I don't want to spend the bucks to upgrade it to SSD. Its replacement will certainly have SSD, and a full HD screen. I hate working with a puny 720p screen.

My observatory computer has an SSD—I should experiment with it. Don't need a sky or darkness to experiment with configurations, settings *etc.* to test/improve FPS.

Fri/Sat, April 23/24

Stephen (17:52): Tonight looks like a nice clear night. It's too bad we're so close to Full Moon. The Moon doesn't set until after 5 a.m. so I can't do galaxies. I'll have to wait a week or so.

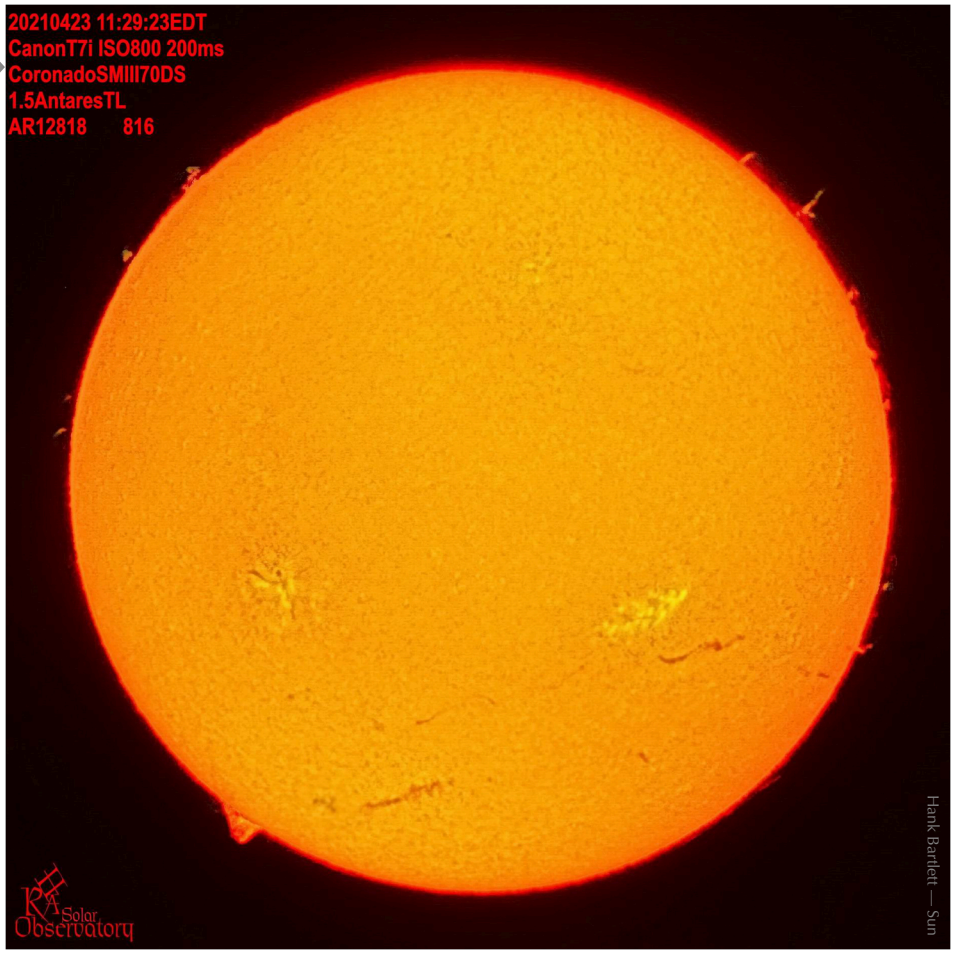
Rick (18:14): I may even try to image the Moon! I have re–arranged the wiring on my refractor that I want to test out so that seems a good option. In addition to my usual photometry of course.

Mark D (21:01): My scope is set up. What are folks looking at tonight?

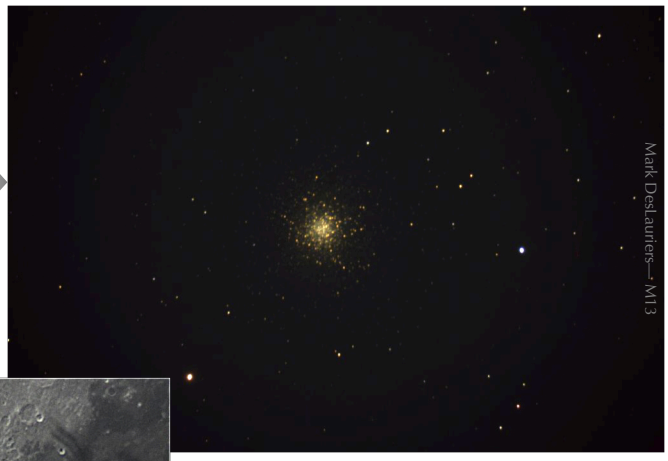
Malcolm (21:36): I'm doing some testing, then after 10 p.m. I'll shoot the Moon.

Mike H (21:39): I was out looking at the Moon boil away in the atmosphere. Lol. The seeing isn't very good!

Rick (22:00): Sheepishly, I'm looking at the TV while my telescope does the observing—cycling through 3 variables in Leo Minor and UMa. But I'm just heading out to start the refractor on RV CrB for a few hours.



Malcolm (22:13): If I wait for good seeing I might as well sell everything.
Mark D (23:08): Funny, I wasn't getting the wavering Moon here. I did get M13 (20x8s).
Mark D (08:38): Moon shot from last night with my ZWO 224 camera. 1000 frames and tinkered with in RegiStax.



Susan: Lovely Moon and M13. My x15 vs your x1000 on the Moon surely tells a tale of stacking success!
Rick: So I had the Sky90 refractor out last night for a first run with its new power/USB hub. Specifically, it's a Pegasus Astro "Ultimate Power Box" power and USB hub. It has 5 x 12V power outputs, 1x variable voltage output (I've set it to 8V for the DSLR), 4 x USB3 and 2 x USB2, 3 dew heater outputs, focuser motor output (so it works as a digital focuser), temp & dewpoint sensor. All the outputs/settings/readings have voltage and current meters, are switchable/accessible from software including ASCOM and INDI drivers.

I tested the focuser (connected to my RoboFocus motor), accessed everything from the UPB software and it all works, connections to CCD camera, guide camera, mount, focuser all came up with no trying to find correct COM ports. And it comes with drivers to allow ASCOM and INDI to operate its many features as power switch, digital focuser, environ–mental sensor, and example Python scripts so I can control it directly from my observing scripts. And all of this is in a small box mounted on the telescope greatly reducing the number of cables dragging along behind the scope as it slews around the sky. I didn't test everything as we had some work to do on the [RASC] remote scope in California which took me into the office for an hour around midnight and then it was past time for bed. But so far, complete success.

Next step will be to test the focuser with FocusMax to see if I can autofocus, confirm that the DSLR output works with the camera, learn to script turning things on and off and getting readings with Python. Then to mount a computer on the telescope beside the UPB and even further reduce the number of cables. Computer will probably be either the Lenovo IdeaStick that I used to use in the observatory or a Raspberry Pi. First I have to figure out how to use wifi on an on–scope computer so I won't need an ethernet cable up to the telescope (wifi from the house doesn't reach with any consistency or speed). I want to see if plugging a little wifi router into a powerline adapter on the pier will allow the computer to connect to my home network.

I also tested out the PHD2 guiding assistant—what a great tool. My initial attempts at guiding went horribly—terrible oscillation and guiding errors above 30". I ran the guiding assistant, made a few changes to settings and suddenly errors are ~1". So I shot ~4 hours on RV CrB—we'll see how the photometry looks later this morning.

And finally, the Boltwood scope collected data all night, the RASC remote scope collected a few hours of data between cloudy periods. All in all a good night.
Mark D: Sounds like a good night since the Moon was out. Did Malcolm also buy one of the Pegasus control boxes? Sounds like a great product.
Rick: Malcolm has the PPB Advance which is one model down. I wanted to buy that one since it is quite a lot cheaper, but it just didn't have enough ports for everything I needed. In fact I had intended to just make my own, but designing it (far from complete) has already taken way longer than I want to spend on it and the result wouldn't have been 10% as nice or functional.
Kevin: Thanks for this report... real leading edge stuff going on at Leeside...Leaside? Lewside? Lucidside? Hmmm, have to check that again.
Rick: Leeside—we are on the lee side of the point, at least for nasty northerly winds. We get the warm

southerlies right in the face.

It's good to be back—the bozo who maintains the campground up the road from us dug through the phone cable for the whole road and cut off everybody's landlines and DSL internet for ~25 hours. You really begin to appreciate how often you use the internet when it says "server not found" every time you go to search for something.

Malcolm: You sure you got the right culprit?

MarK: When a beaver does the same thing, it makes the CBC news...

Rick: Oh yeah, we got the right guy—we found him whistling innocent–like and sheepishly trying to shift around to keep us from seeing past him to the backhoe with wires in its teeth.

Not really, he admitted it and even phoned Bell. Probably had to pay for the repairs, or should have.

Sunday, April 25

Hank (15:01): Just came in from an imaging session between the fast moving clouds: some good

Another Image Editor
affinity.serif.com/en-us/

Malcolm: Affinity, looks very powerful. USD $25, onetime lifetime license. I just bought it (to clarify, I'm using Affinity Photo).

Graeme: I'm still learning Affinity but their astro stacking is pretty solid for beginners (it's mostly automated).

Rick: WOW! WOW! WOW! I just had a look at this Affinity Photo, especially the YouTube tutorial on stacking Hubble palette astro images. Astro images? That's right, they have all sorts of astrophotography tools built in! Stacking, hot pixel detection and removal, full image reduction with bias, dark, flat frames, star alignment, star removal, 32–bit image pro–cessing, works right from FITS. There is a whole series of astro image processing tutorials. My initial assessment is that this beats the snot out of Photoshop, and all for a few percent of the price. Photoshop is now officially dead and buried. Let it never be mentioned again!

If only it was available for Linux—they are so close with it running on Mac. But, pending working with it a bit to confirm, my impression right now is that I would probably keep Windows running just for this one app alone.

Mark D: You have to watch that more then once to get the hang of it.★

proms, filaments and spots. 82 images. I'll see how they turn out after the Jays beat the Rays. Wine time!

Susan (19:25): I suspect you will have some great images.

This afternoon, when I was not being blown off my perch, the view was amazingly steady, great detail seen even at 50X. Nice array of spots!

Tuesday, April 27

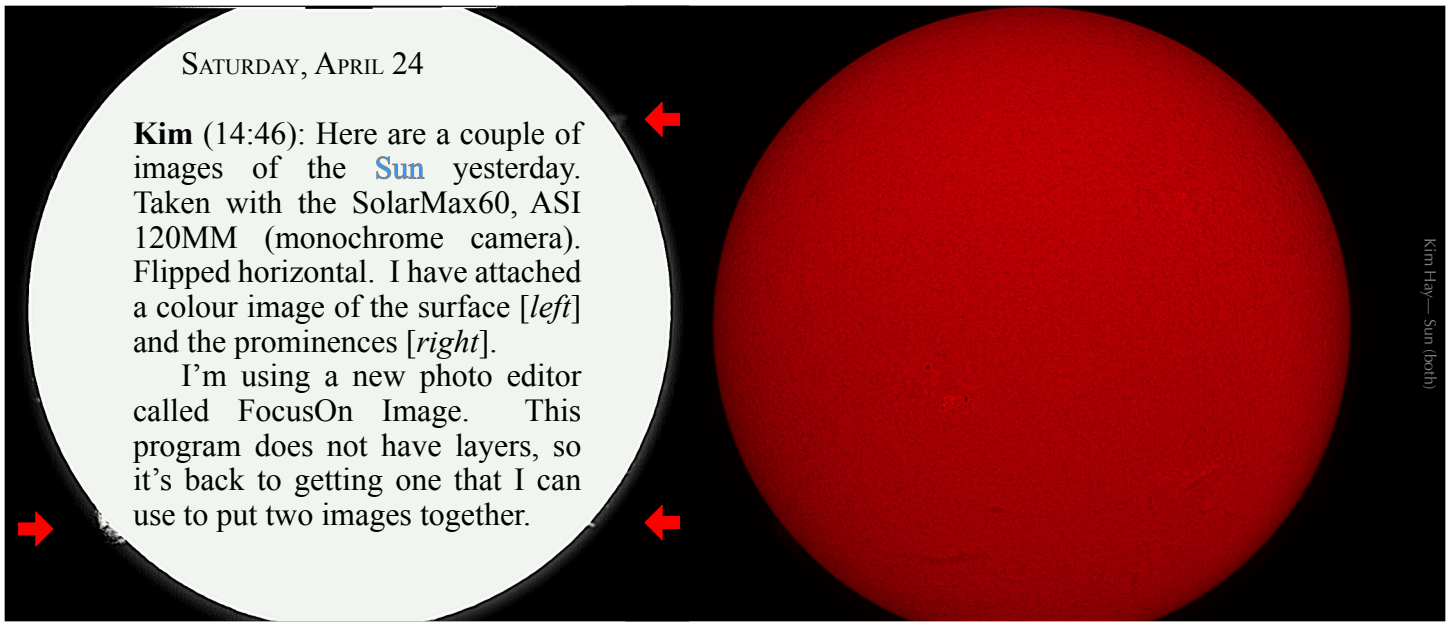
Hank (23:31): We got a long awaited decent thunderstorm tonight. It has been a few years since I have seen this good. These 6 images [*next page*] were pulled from 384 frames of Samsung S10 video lasting about 4 seconds and come from less than 1 second of a single strike.

Dieter (00:37): Awesome!

Saturday, April 24

Kim (14:46): Here are a couple of images of the Sun yesterday. Taken with the SolarMax60, ASI 120MM (monochrome camera). Flipped horizontal. I have attached a colour image of the surface [*left*] and the prominences [*right*].

I'm using a new photo editor called FocusOn Image. This program does not have layers, so it's back to getting one that I can use to put two images together.



Kim (05:52): It was intense. I saw one hit in the north that was forked and looked like 9 o'clock hands. Then the rumble shook the house.

It kept going for quite a while.

Nice captures Hank.

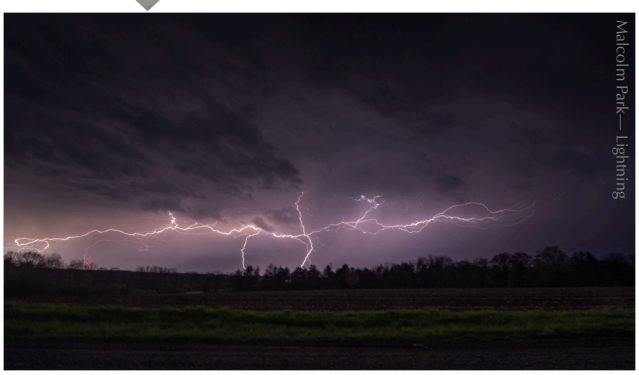
Kevin (08:03): It was great...now is the time I wished we lived on a mountaintop...with the house just slightly *below* the top of the mountain, balancing the view *vs* repeated shocks to the system!

Rose–Marie: I am sooo looking forward to getting moved out to the lake with a decent view. I tried to get a few shots when it wasn't raining, but...power lines, and cars driving by.

Malcolm: From a storm chasing standpoint, the move from the county has already been a rip–roaring success.

All these storms are missing the county and that has always been the pattern. No more storm envy!

Meanwhile from Sydenham near the water tower I saw this crazy lightning display from inside the car (at about 9:30 p.m. looking to the north).


Malcolm Park — Lightning

Rick: That's about when the storms went by mostly north of us. Not much lightning—a half dozen really bright mostly in–cloud bolts. But the thunder was spectacular, not too loud, but very slow soft crackly and very long, fading into subsonic rumbles. Almost like it was being played back at ¼ speed. Often had thunder continuously for over 2 minutes. I sat out working on my laptop on the deck just so I could listen for a half hour.

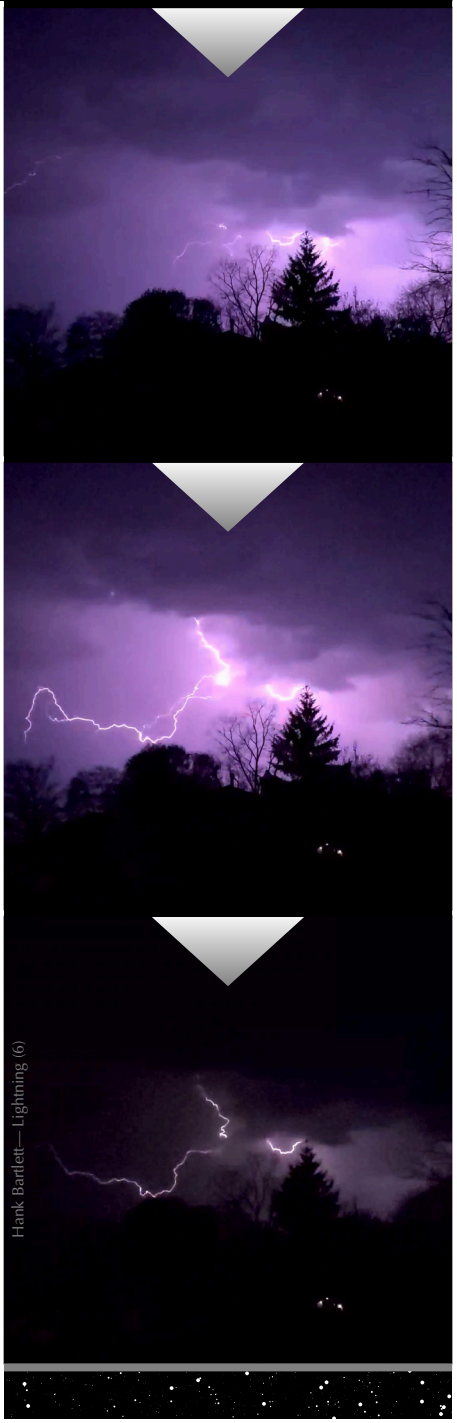
We're getting occasional distant rumbles this afternoon [*April 28*] too, though there is nothing promising/threatening on the radar. We're also getting some much needed rain finally.

Mike H: I love the lightning shots!

Malcolm: They went on for a good 2½ hours starting when I noticed them about 7:15 p.m. There were cells all around me, every direction I would look I could see lightning north, south, east and west. I did not have to go far to get a good horizon.

Hank: Beautiful! We saw something simi–lar: it was two–staged and so wide it crossed all of our visible WSW sky. Glad you are not missing out.

Rose–Marie: We had some nice streaks go across the sky here at Glenburnie.★


Hank Bartlett — Lightning (6)