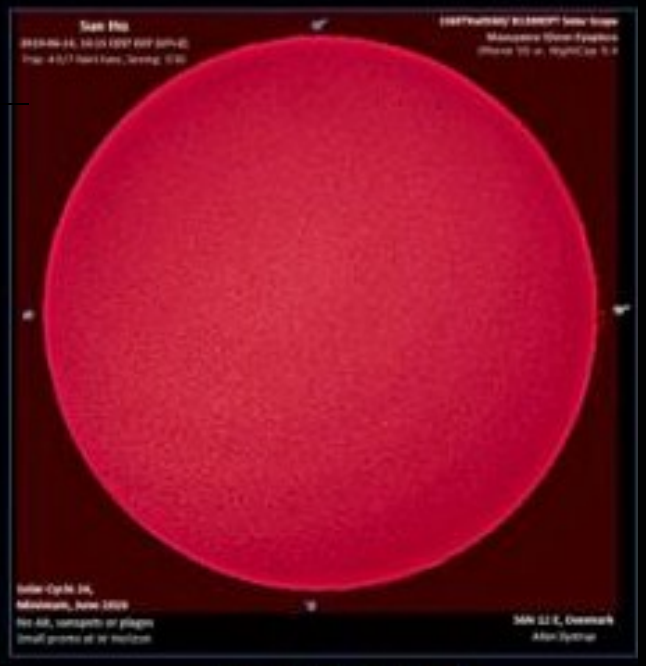
SUN AT START OF SOLAR CYCLE 25, 2020-0326 10:30 CEST (UT+1). TRANSP. 3-4/7, SEEING 5-6/10, CALM WITH THIN HIGH CIRRUS, 7°C, 48% HUM., -3°C DEWPT.

Solar Cycle 25

March 2020



Sun in Hα 2019-06-14
LS60THaDS60/ B1200CPT SS
Masuyama 32mm Eyepiece
<0.7 Å FWHM BANDPASS
iPhone 5S, NightCap 9.4

It's the end of March 2020, and I'm out in my backyard, observing the sun for the first time since June last year. We have moved from the end of solar cycle 24, and are now at the **start of cycle 25**. There was not much to observe at the solar disc one year ago (see insert on image below), and frankly there is not a lot more today: no active regions, sun spots or plage-areas, -- only a couple of small quiescent arc proms at the solar limb.

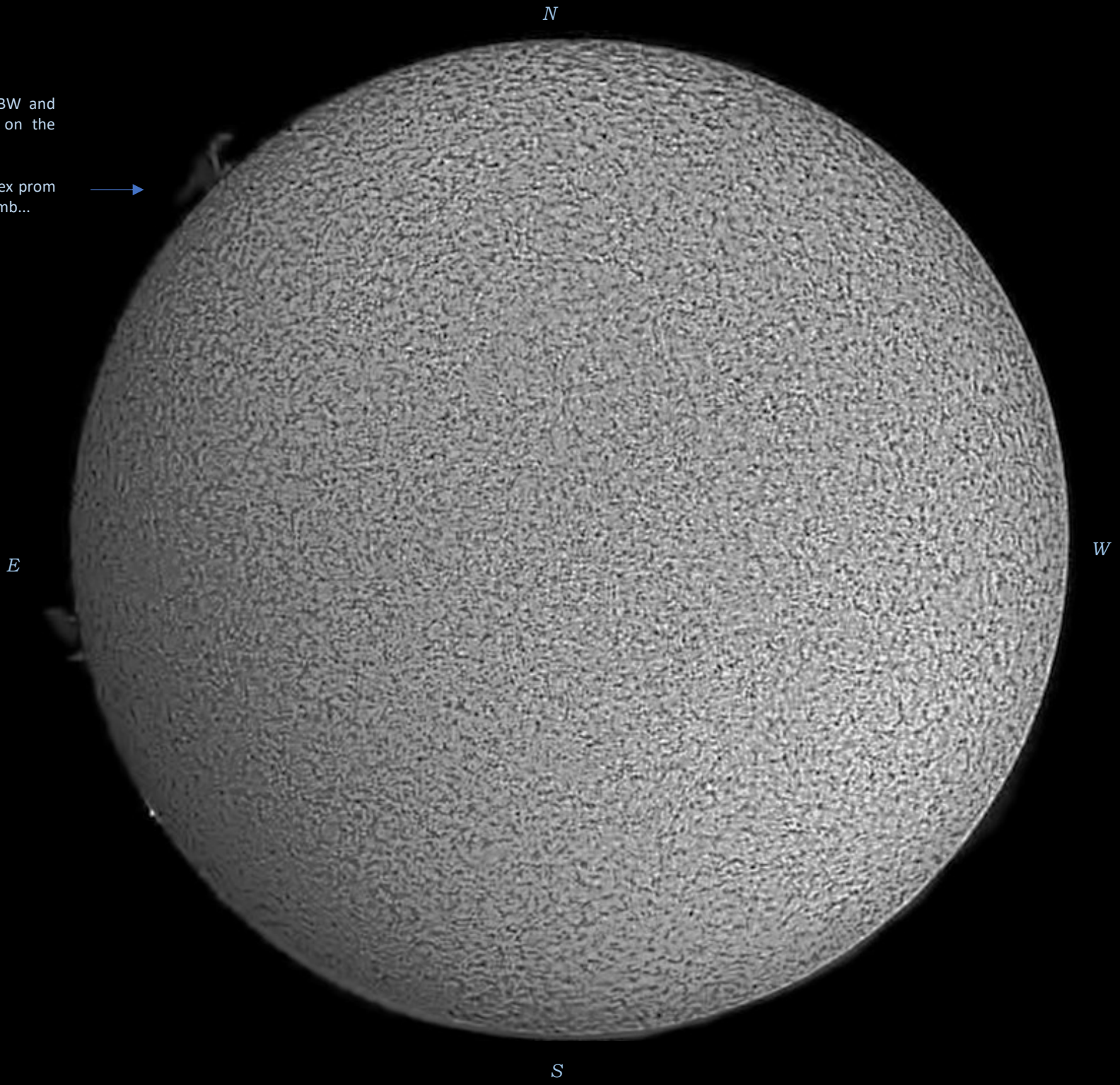
Both observations were done in **Hα using my Lunt 60mm** solar scope, the first in *single-stack* mode and taking a snapshot with my iPhone 5S, the second in *double-stack* mode shooting a short video with my CM3 industrial cam. The resolution and contrast of the basic chromosphere network is of course significantly better seen in the DS image and also better captured using lucky imaging. But I feel that I'm getting a little rusty in my solar observation, recording and processing due to the many months without any major solar activity. I'm hoping that will start to change in the coming months...

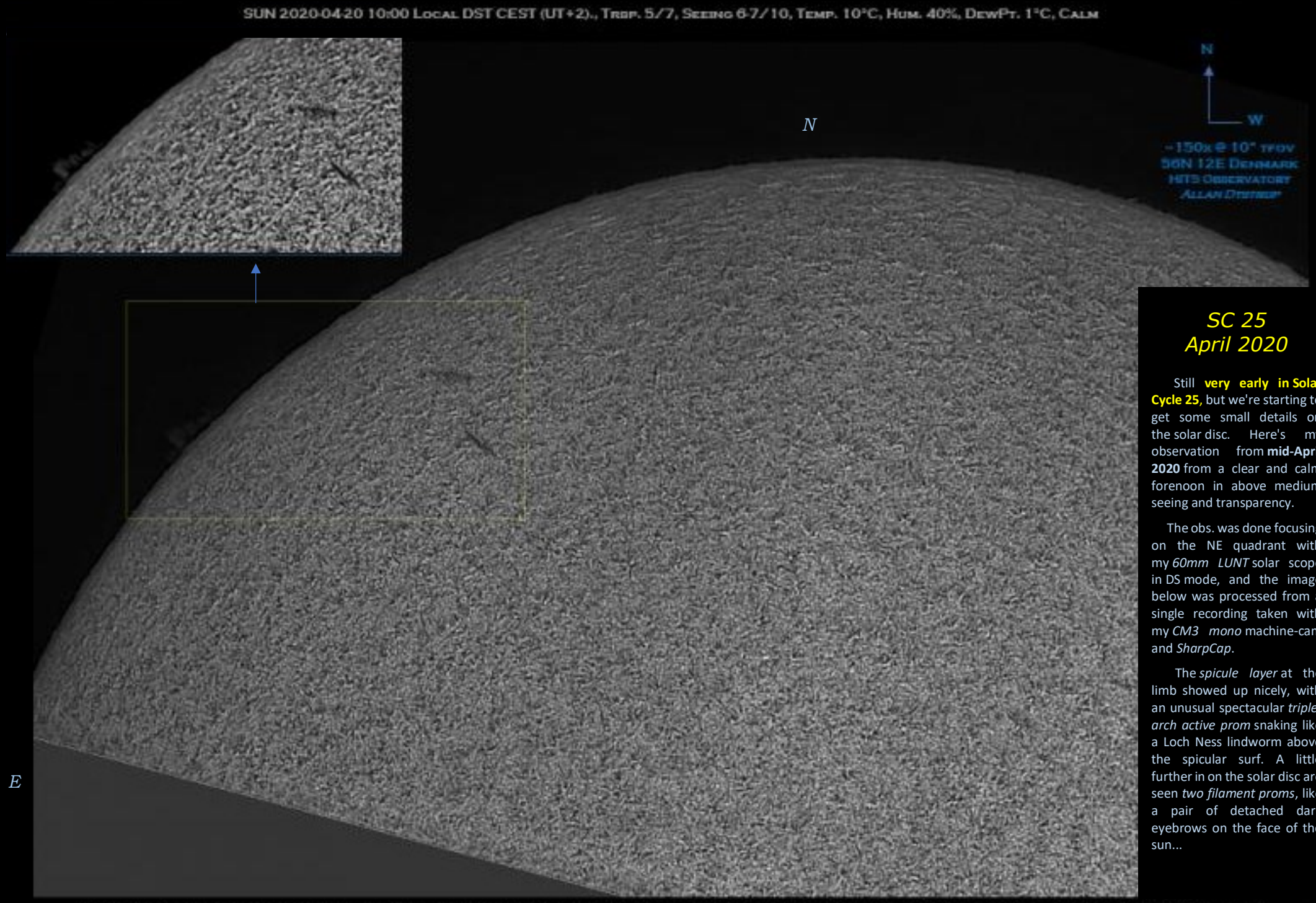
HYDROGEN ALPHA
<0.5 Å FWHM BANDPASS
@ 656 NM SPECTRAL LINE

56N 12E DENMARK
HITS OBSERVATORY
ALLAN DYSTRUP

Same as above, but in BW and stepping a little harder on the contrast;

Brings out better the T-Rex prom running up the NE solar limb...





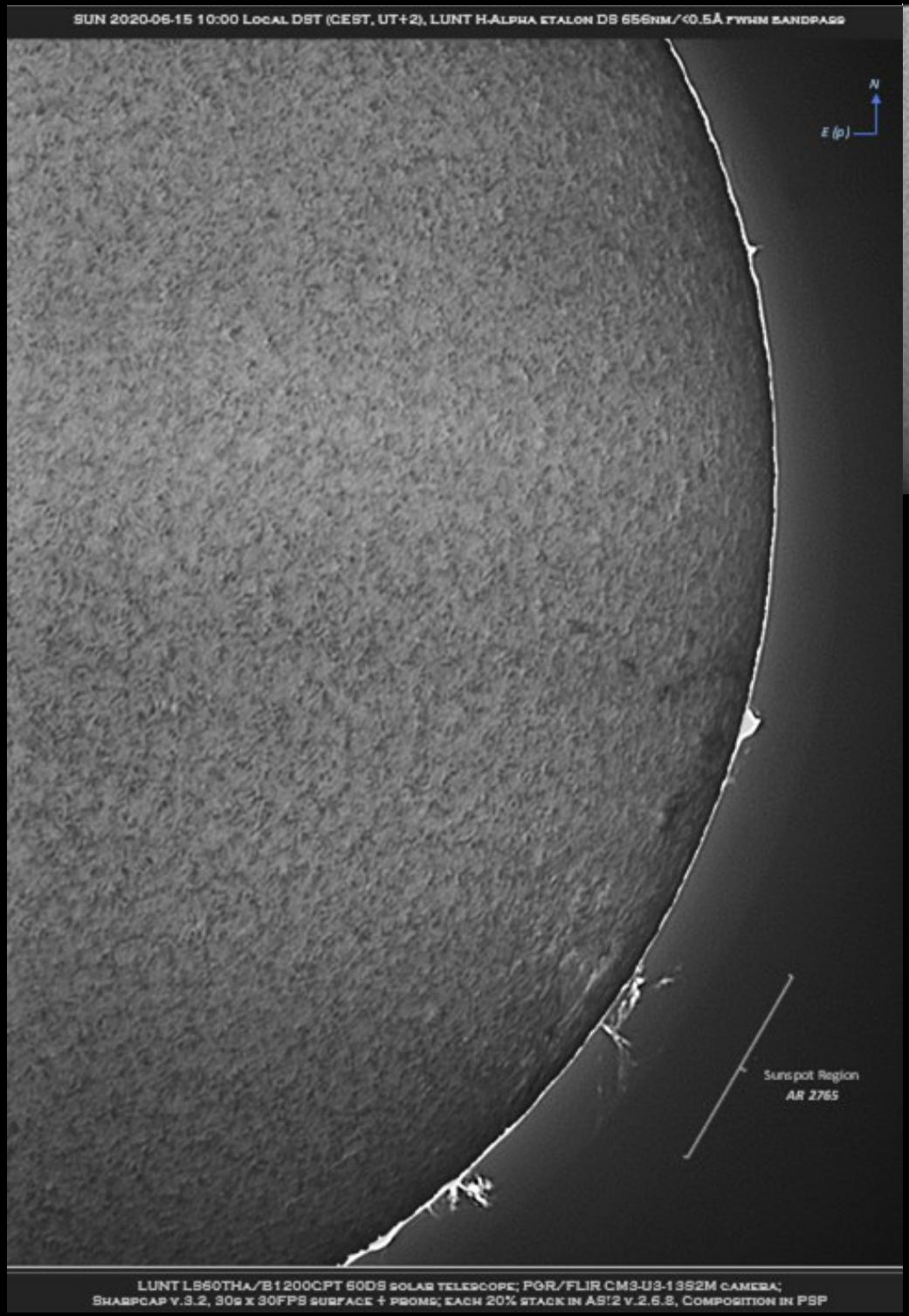
SC 25
April 2020

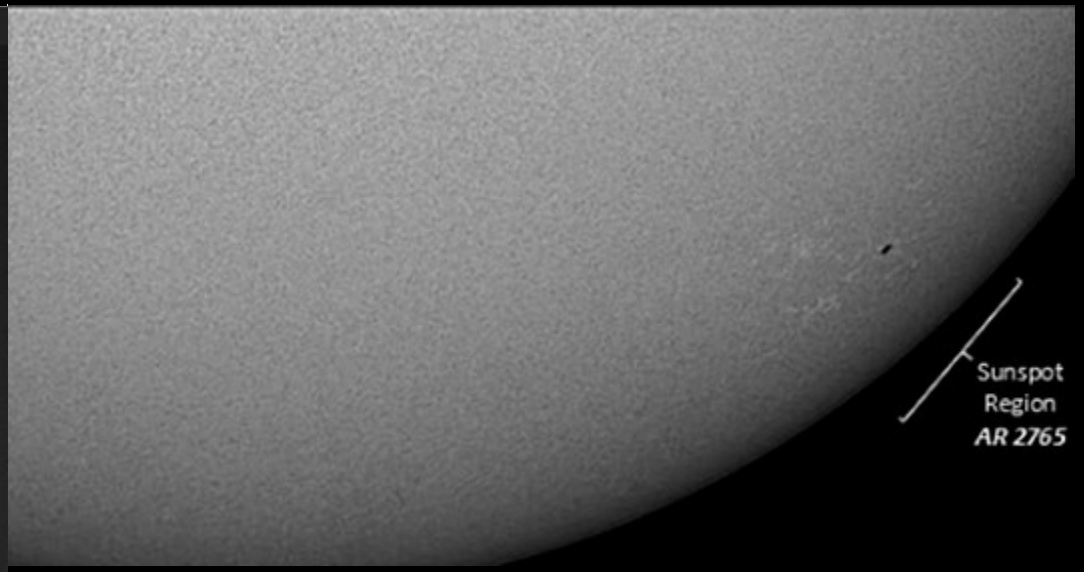
Still **very early in Solar Cycle 25**, but we're starting to get some small details on the solar disc. Here's my observation from **mid-April 2020** from a clear and calm forenoon in above medium seeing and transparency.

The obs. was done focusing on the NE quadrant with my *60mm LUNT* solar scope in DS mode, and the image below was processed from a single recording taken with my *CM3 mono* machine-cam and *SharpCap*.

The *spicule layer* at the limb showed up nicely, with an unusual spectacular *triple-arch active prom* snaking like a Loch Ness lindworm above the spicular surf. A little further in on the solar disc are seen *two filament proms*, like a pair of detached dark eyebrows on the face of the sun...

~150x Magnification 10° TFOV, Lunt LS60THa DS60/B1200CPT, Baader 1.7x GPC, PGR CM3-U3-13S2M Cam. + UV/IR cut. Stack 8% of 155/30 FPS exposure.





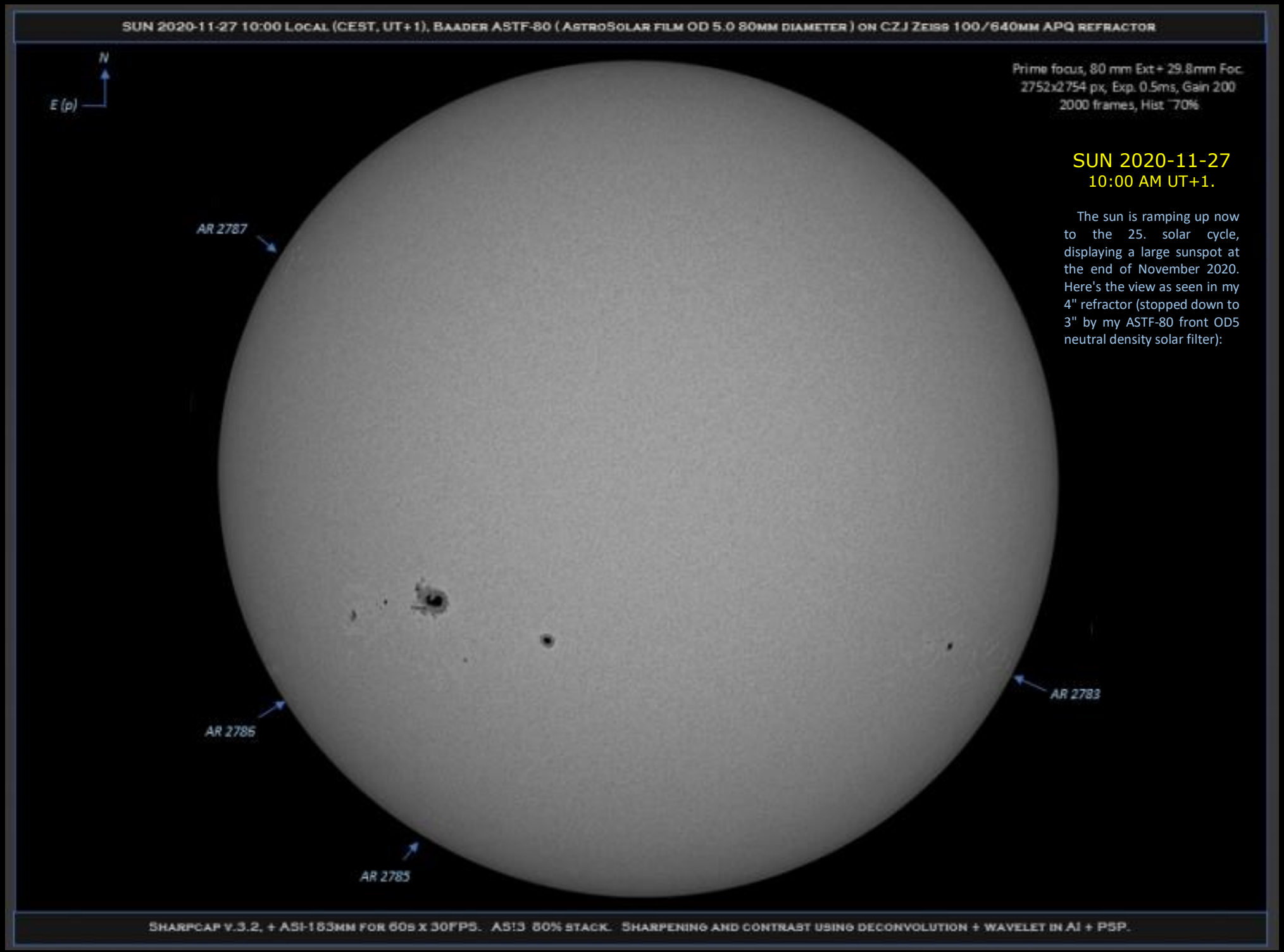
SUN 2020-06, 14-15 AM UT+2

Solar cycle 25 is slowly awakening, showing a spike in solar activity at the end of May 2020 followed by a small solitary sunspot AR2765 rotating in on the solar disc in the start of June; This active region is now close to rotating behind the W solar limb, so I went out the past weekend to record it, first in white light with my 4" refractor and then the next day in Hα using my 60mm solar scope.

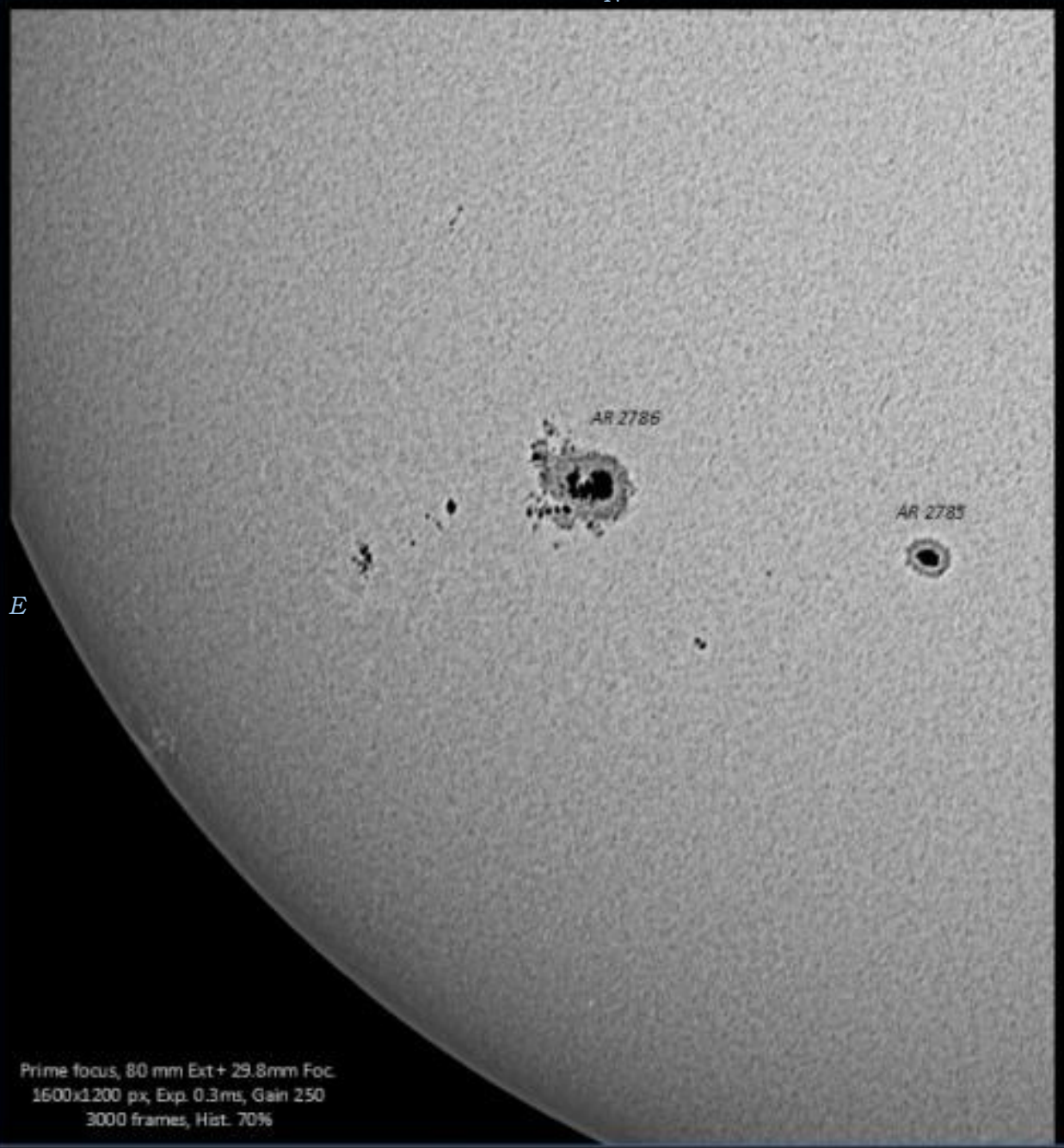
In *white light* at 50-80x magnification, the sunspot AR2765 is rather unimpressive with the weak magnetic field creating just one small spot located in an area with a couple of plages branching out towards the SE.

In *Hα, however*, the sunspot is seen spitting arching pillars of fire out at the horizon, and it is accompanied by a handful of smaller proms showing up as dark filaments on the solar disc to the N; One of these filaments is seen "in profile" as a pyramidal prominence at the limb:

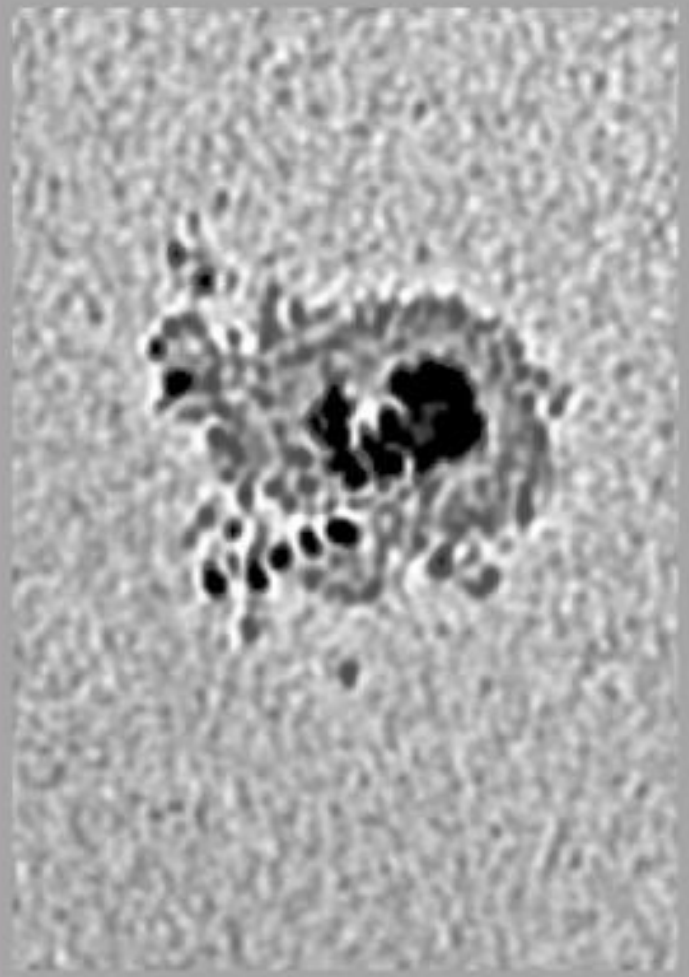
Baader SC 540nm/10nm FWHM,
PGR/FLIR CM3-U3-13S2M cam+ FireCapture v.2.6
Exposure 11s x 20fps, Stack 15%
80x mag in ½° FOV


SUN 2020-11-27 10:00 Local (CEST, UT+1), Baader ASTF-80 (AstroSolar film OD 5.0 80mm diameter) on CZJ Zeiss 100/640mm APQ refractor
N
E (p)
Prime focus, 80 mm Ext + 29.8mm Foc.
2752x2754 px, Exp. 0.5ms, Gain 200
2000 frames, Hist ~70%
SUN 2020-11-27
10:00 AM UT+1.
The sun is ramping up now to the 25. solar cycle, displaying a large sunspot at the end of November 2020. Here's the view as seen in my 4" refractor (stopped down to 3" by my ASTF-80 front OD5 neutral density solar filter):
AR 2787
AR 2786
AR 2785
AR 2783
SharpCap v.3.2, + ASI-183mm for 60s x 30FPS. AS!3 60% stack. Sharpening and contrast using deconvolution + wavelet in AI + PSP.

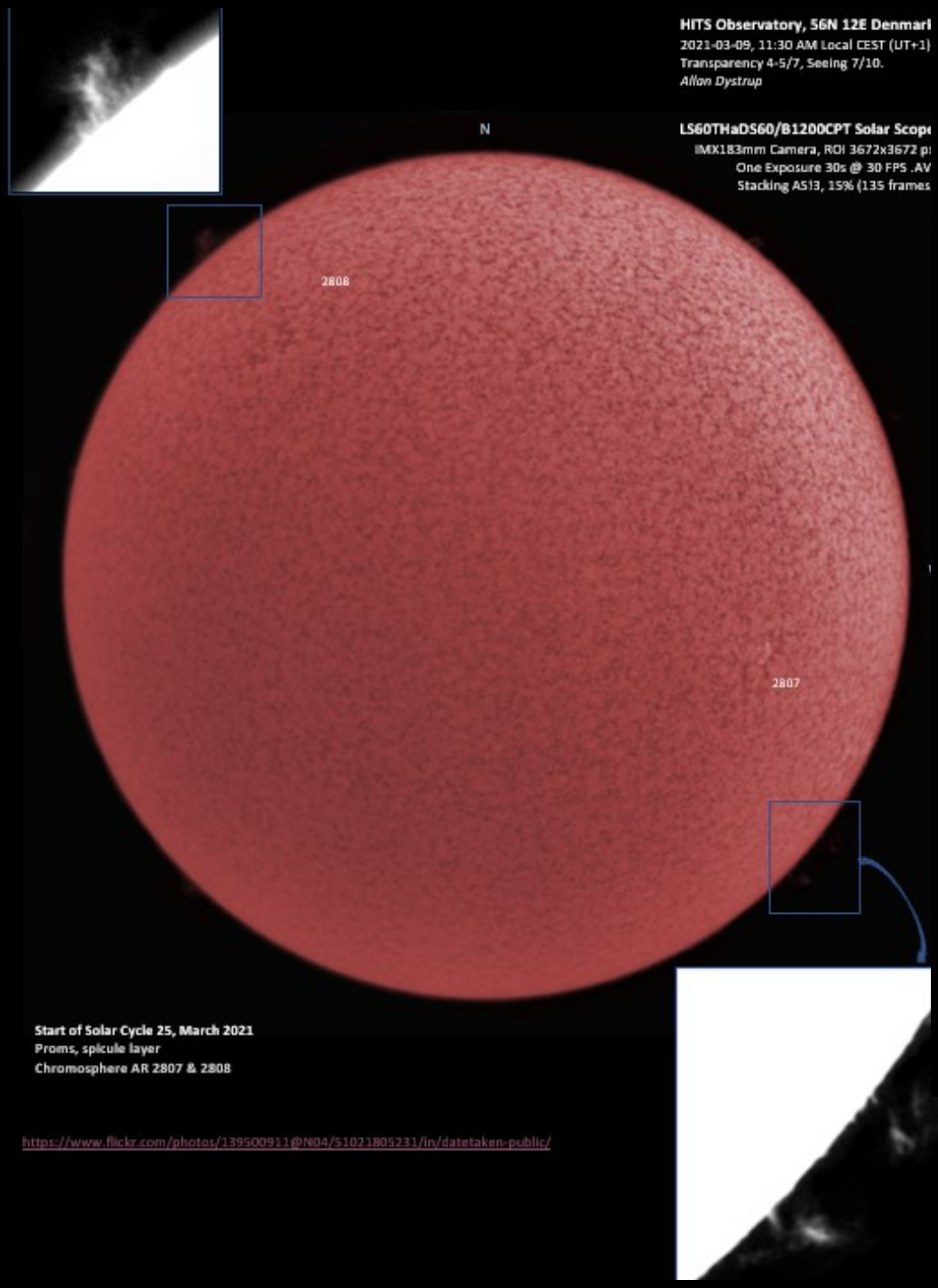
SUN 2020-11-27 10:00 Local (CEST, UT+1), Baader ASTF-80 (AstroSolar film OD 5.0 80mm diameter) on CZJ Zeiss 100/640mm APQ refractor

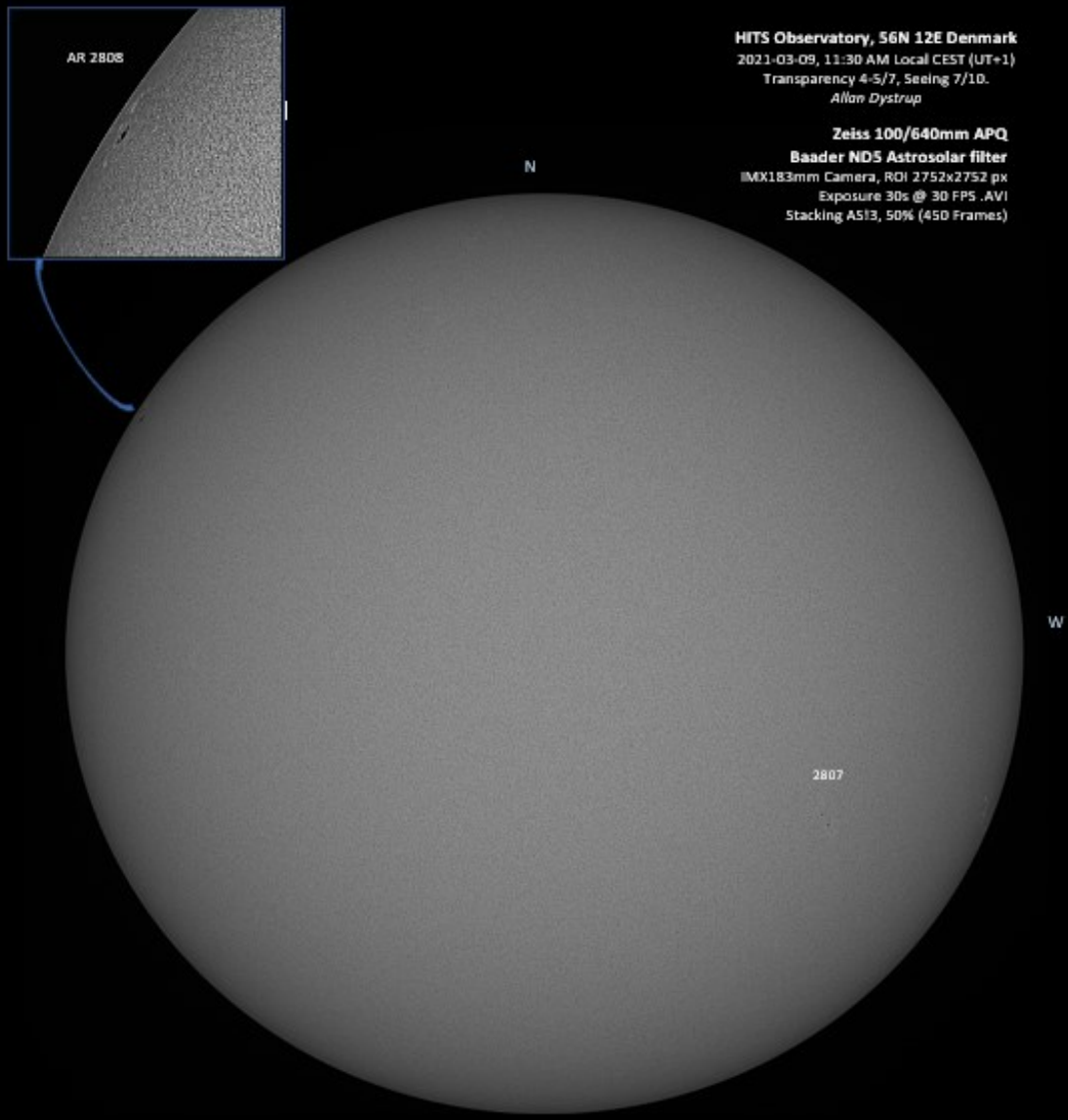


SharpCap v.3.2, + ASI-183mm for 90s x 30FPS. AS!3 75% stack.
Sharpening and contrast using deconvolution + wavelet in AI + PSP.



SharpCap v.3.2, + ASI-183mm for 90s x 30FPS. AS!3 40%.
Sharpening and contrast using deconvolution + wavelet.





SUN 2021-03-09 11:30 AM UT+1.

We're moving into spring now, here on the N hemisphere, and the Sun is slowly coming out of the 24/25 solar cycle minimum and starting to show some chromosphere details (there is not much to see in white light right now).

In this observation I tried to strike a filter tuning balance between catching the outline of the proms and the spicule layer at the limb, while still retaining a good amount of surface structures. This succeeded to a certain degree, as can be best seen in the full res. images linked to below:

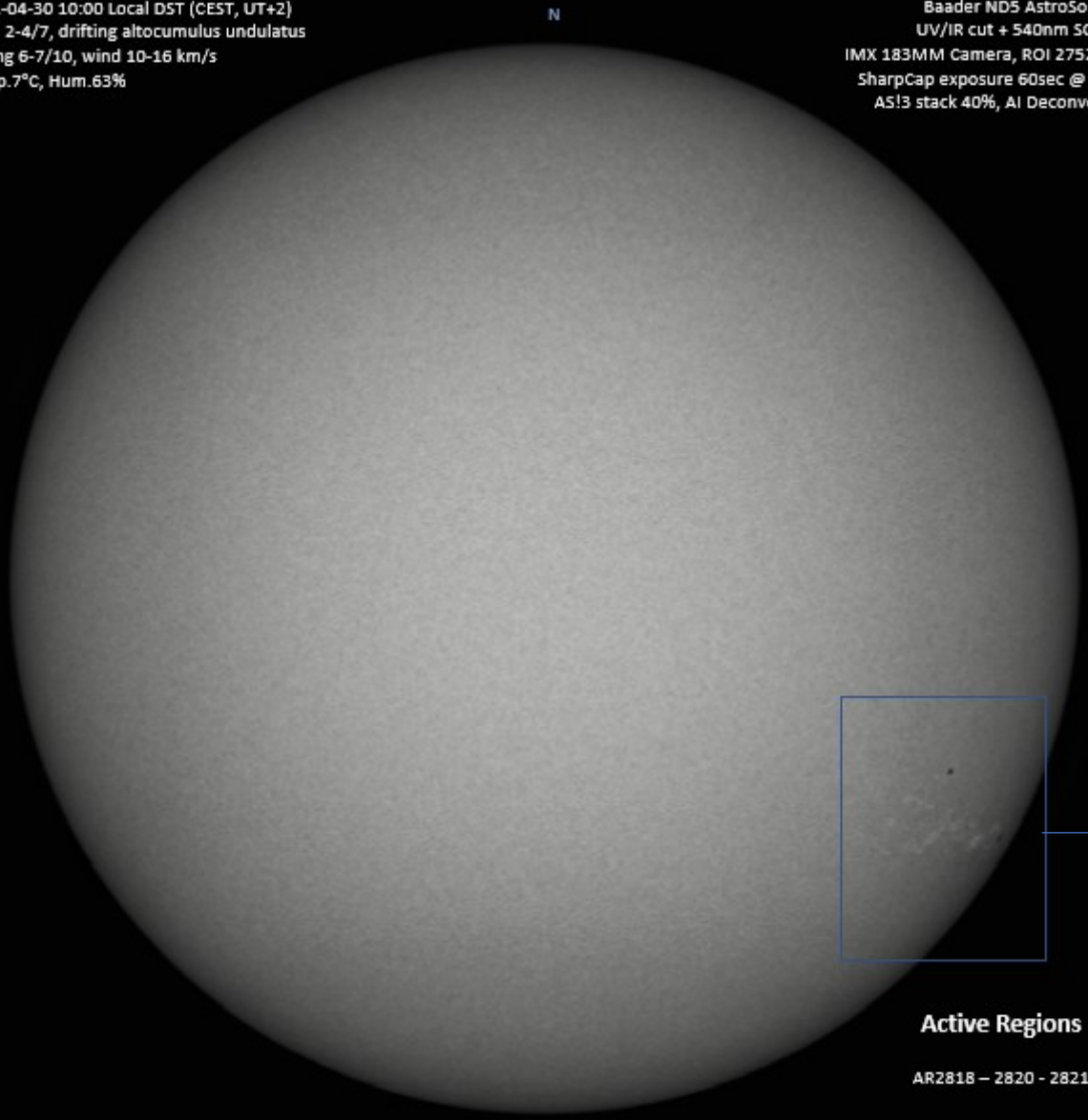
https://www.flickr.com/photos/139500911@N04/51021805231/in/datetaken-public/
https://www.flickr.com/photos/139500911@N04/51022517247/in/datetaken-public/

SUN Continuum / Photosphere

2021-04-30 10:00 Local DST (CEST, UT+2)
Trsp. 2-4/7, drifting altocumulus undulatus
Seeing 6-7/10, wind 10-16 km/s
Temp.7°C, Hum.63%

Zeiss 100/640 APQ

Baader ND5 AstroSolar film
UV/IR cut + 540nm SC filters
IMX 183MM Camera, ROI 2752x2754
SharpCap exposure 60sec @ 30 FPS
AS!3 stack 40%, AI Deconvolution



Full res. image:
https://www.flickr.com/photos/139500911@N04/51149200425/in/datetaken-public/

SUN 2021-04-30 10:00 AM DST (CEST, UT+2)

A small train of sun spots has been on the move across the sun the past days, and can now be seen rotating across the SW horizon.

I had a look at them with my 4" refractor this early AM, in so-so transparency but above medium seeing.

SUN 2021-05-28
14.00 Local DST (CEST, UT+2)

I'm a bit late to the party celebrating the first paired group of active regions in this solar cycle : 2826 & 2824.

But here's first a view of the photosphere from two days ago, when they were rotating past the W rim of the solar disc:

N

W

Full Res. image:
https://www.flickr.com/photos/139500911@N04/51216665522/in/datetaken-public/

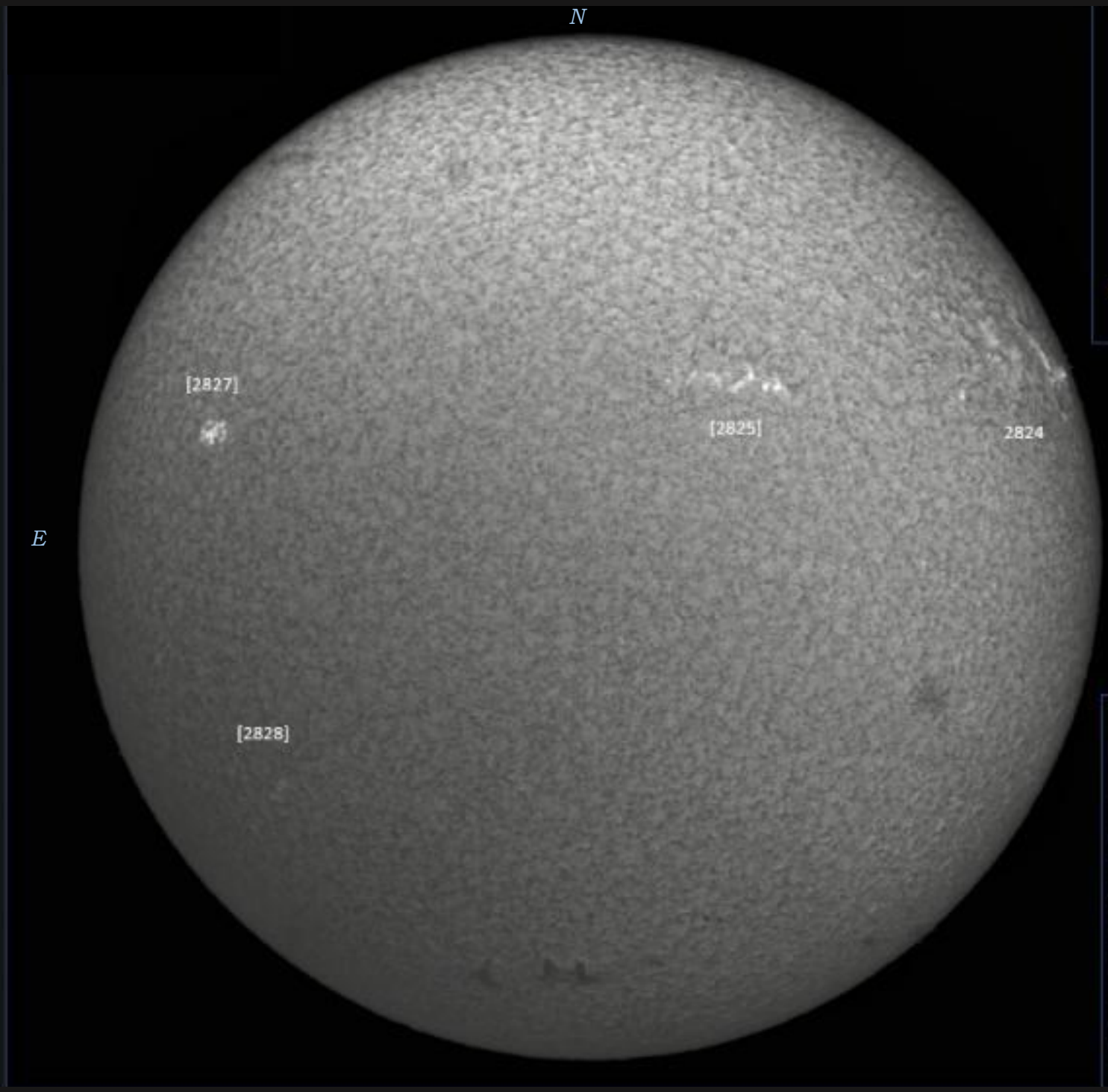
HITS observatory
56N 12E, Copenhagen Denmark
2021-05-28, 14:00 Local CEST, UT+2
Trsp.: 4/7, 20% drifting clouds
Seeing 4-5/10, Wind NW 19-27 km/h
Temp 15°C, Hum. 56% (DewPt. 5°C)

Zeiss 100/640mm APQ
Baader D-ERF dielectric front filter
Baader/Zeiss CC Herschel Wedge
with Baader OD3 neutral density filter

IMX183MM Camera, ROI 2752x2754
Exp.: 120s @ 30 FPS, Stack: AS!3 60%
PostProc.: AI contrast and tone.

Full Res:
https://www.flickr.com/photos/139500911@N04/51216665522/in/datetaken-public/


N
Crop of Above Image
A closer-up crop of
the Active regions :
AR2826 & 2824:
2826
2824
W



HITS observatory
56N 12E, Copenhagen Denmark
2021-05-29, 16:00 Local CEST, UT+2
Trsp.: 4/7, Clear
Seeing 6/10, Wind NW 18 km/h
Temp 12°C, Hum. 69%

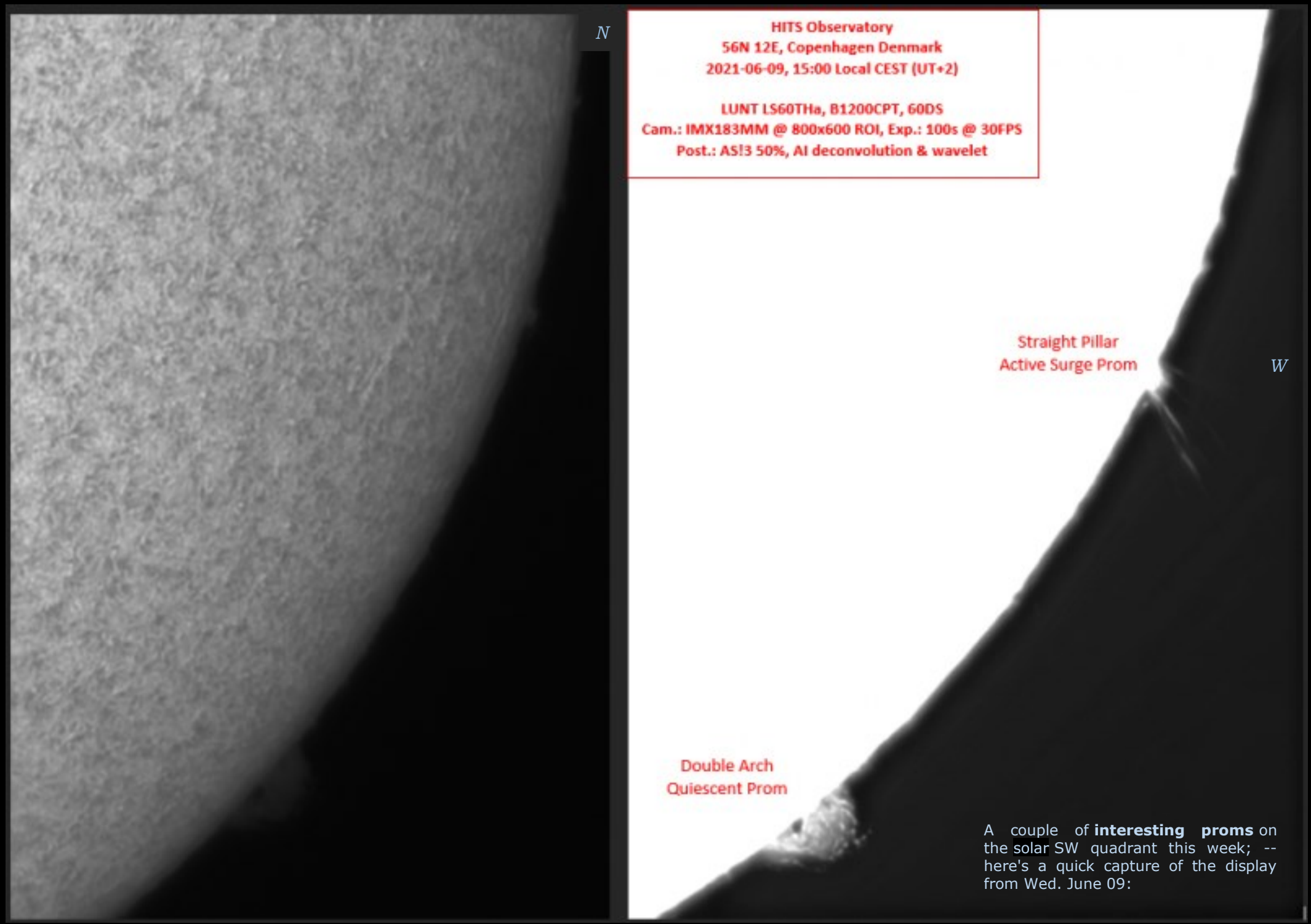
Lunt LS60THaPT DS60 B1200 prime foc.
IMX183MM Camera, ROI 2752x2754
Exp.: 150s @ 30 FPS, Stack: AS!3 50%
PostProc.: AI contrast and tone.

Full Res:
https://www.flickr.com/photos/139500911@N04/51217532141/in/datetaken-public/

And -- from the following day -- the view of the solar chromosphere in the H-alpha line:

Full res. image:
https://www.flickr.com/photos/139500911@N04/51217532141/

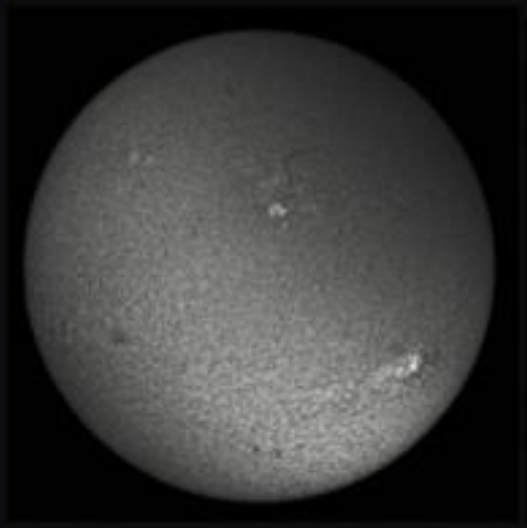

N
Crop of Above Image
Crop of the active regions in the NW quadrant:
2824
[2825]
W

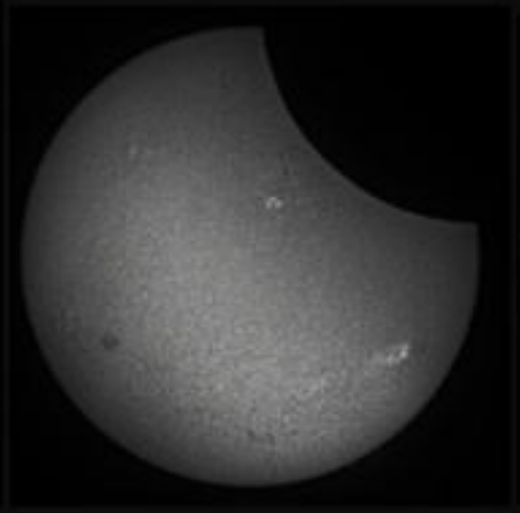


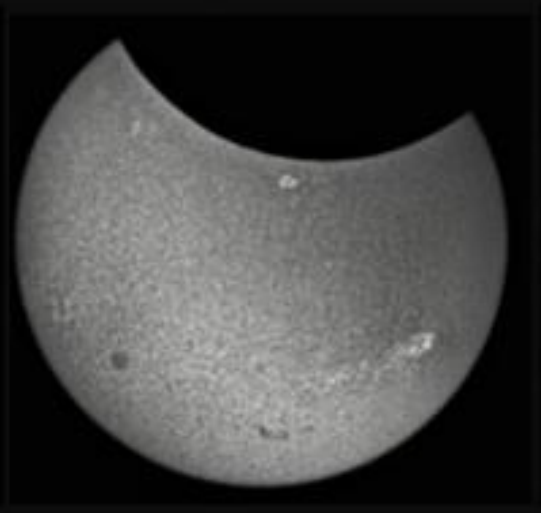
A couple of **interesting proms** on the solar SW quadrant this week; -- here's a quick capture of the display from Wed. June 09:

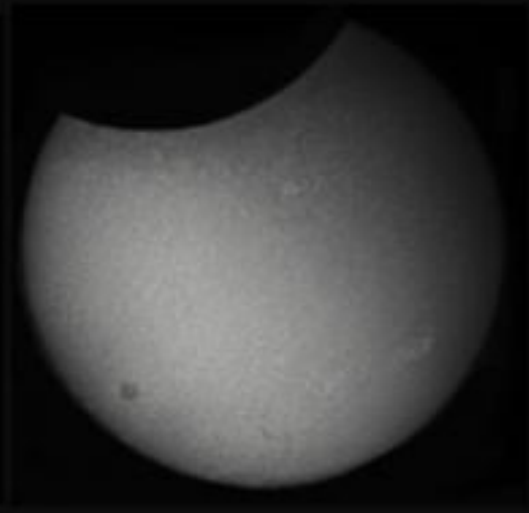
Partial Solar Eclipse
2021-06-10 12:00 Local CEST (UT+2)
Copenhagen, 56N 12 E

The observing conditions deteriorated steadily from medium to bad, as can be seen from the images of the sky and the sun recordings below. For the observation, I used my 60mm LUNT solar scope with recordings using my IMX183 mono camera.







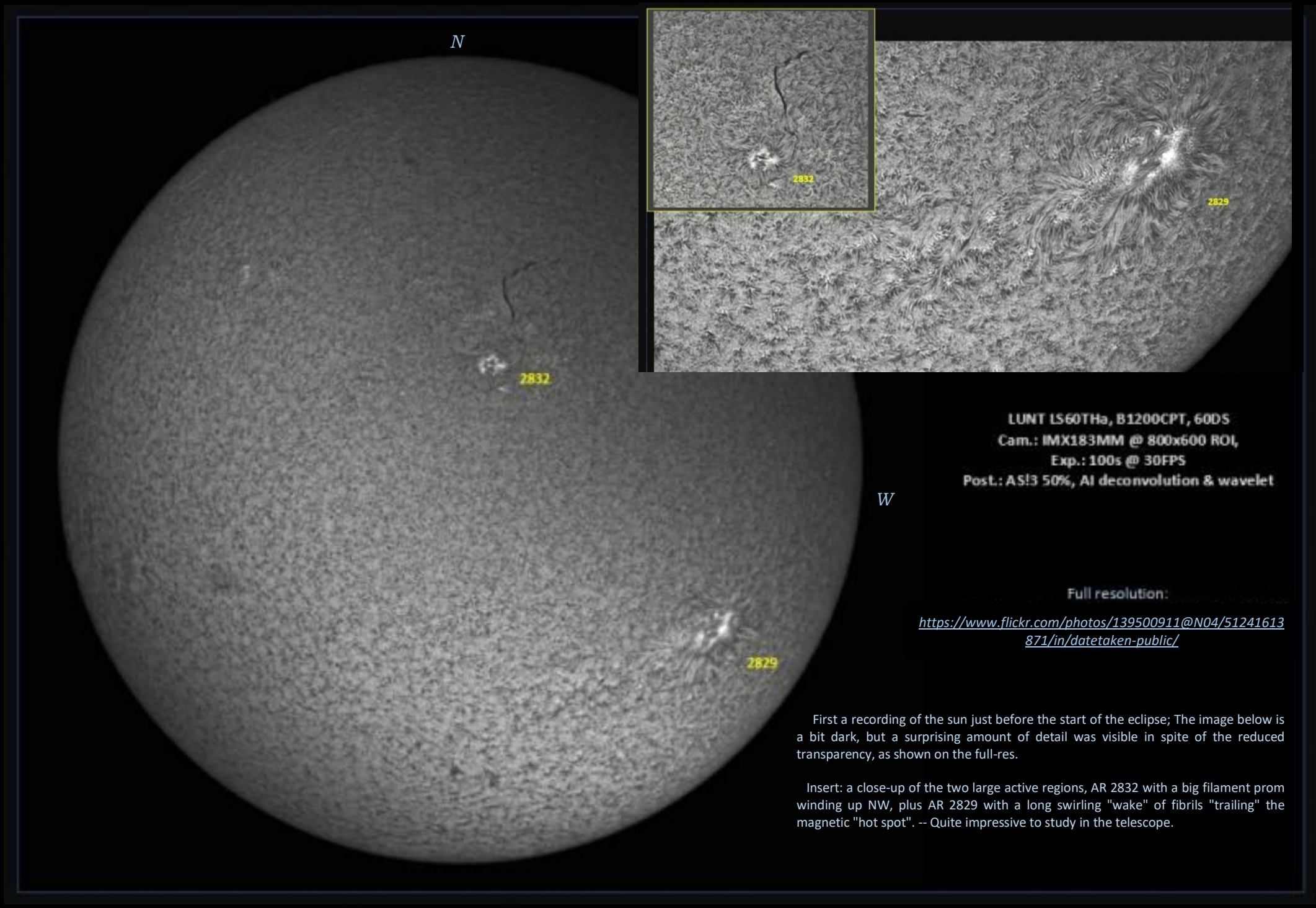


11:00
0%

12:00

12:40
33%

13:20



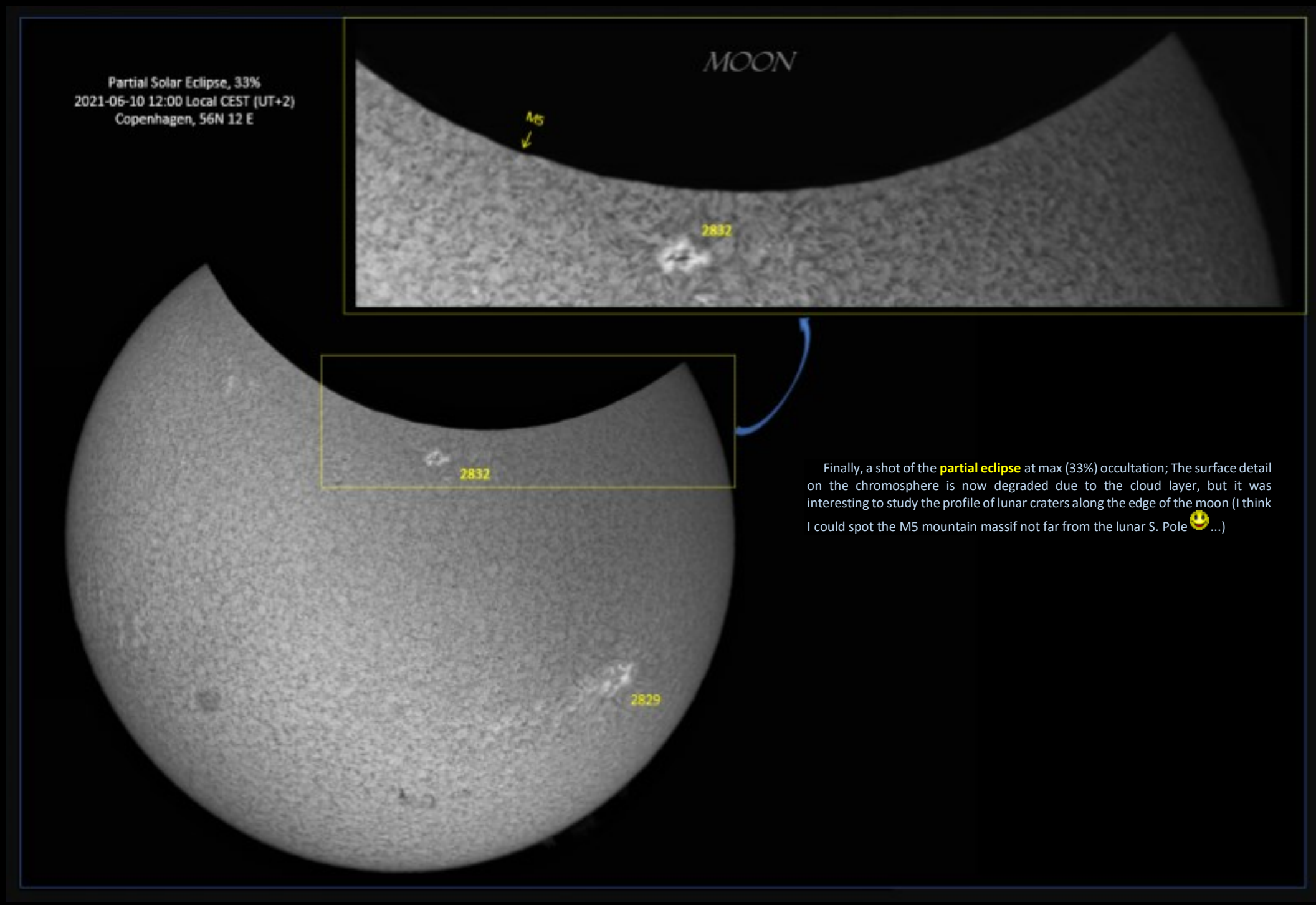
LUNT LS60THa, B1200CPT, 60DS
Cam.: IMX183MM @ 800x600 ROI,
Exp.: 100s @ 30FPS
Post.: AS!3 50%, AI deconvolution & wavelet

Full resolution:

https://www.flickr.com/photos/139500911@N04/51241613871/in/datetaken-public/

First a recording of the sun just before the start of the eclipse; The image below is a bit dark, but a surprising amount of detail was visible in spite of the reduced transparency, as shown on the full-res.

Insert: a close-up of the two large active regions, AR 2832 with a big filament prom winding up NW, plus AR 2829 with a long swirling "wake" of fibrils "trailing" the magnetic "hot spot". -- Quite impressive to study in the telescope.

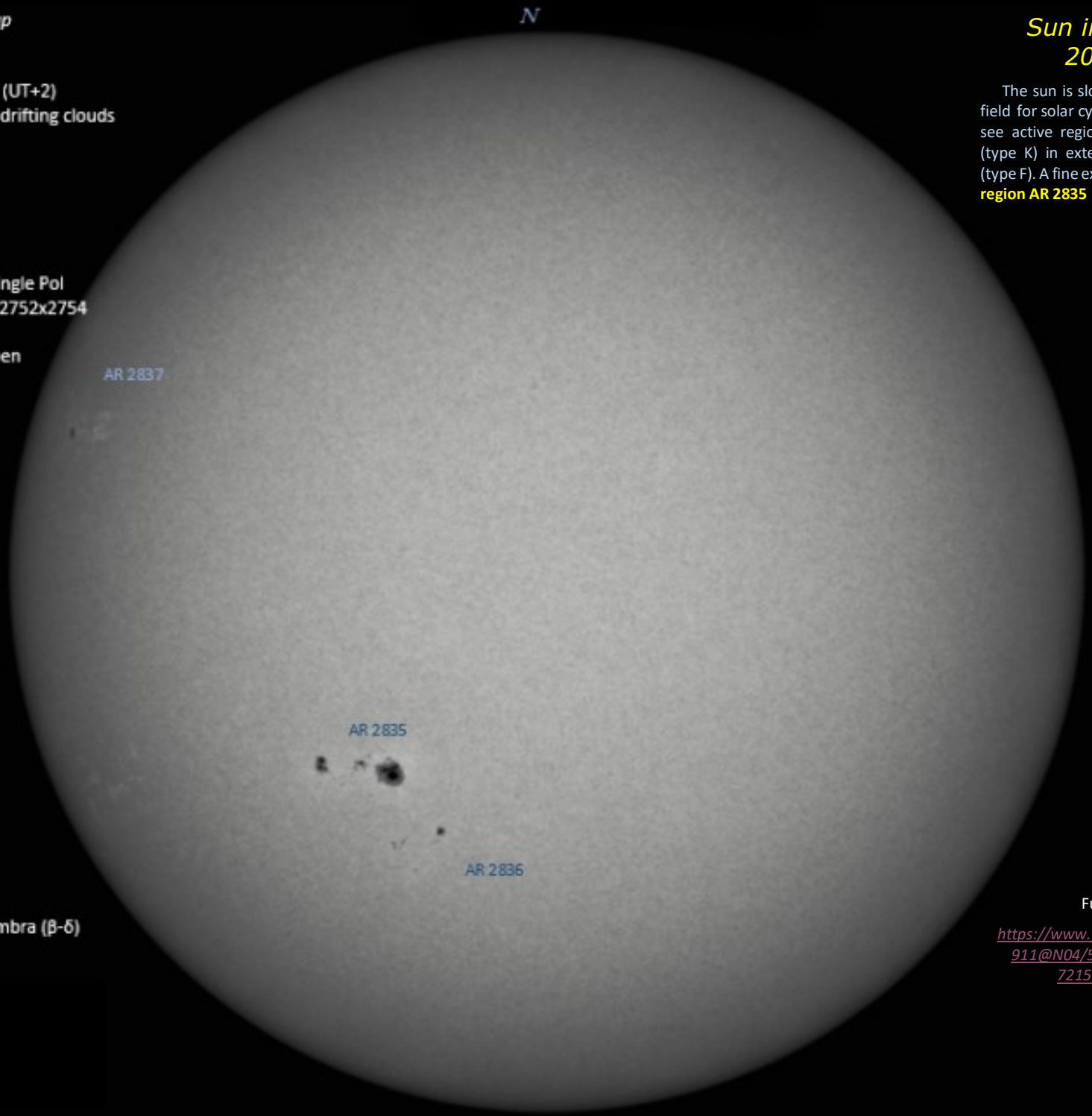


Finally, a shot of the **partial eclipse** at max (33%) occultation; The surface detail on the chromosphere is now degraded due to the cloud layer, but it was interesting to study the profile of lunar craters along the edge of the moon (I think I could spot the M5 mountain massif not far from the lunar S. Pole ...)

HITS Observatory, *Allan Dystrup*
56N 12E, Copenhagen DENMARK

2021-06-29, 09:00AM Local CEST (UT+2)
Transparency: 3-4/7, high haze + drifting clouds
Seeing: 7/10, calm

Telescope: Zeiss 100/640 APW
Baader D-ERF front filter
Baader CC Herschel Wedge
Baader ND-filter: OD 3.0 (T 0.1%)
Visual: TV 41mm PAN + Baader Single Pol
Photo: Camera IMX183MM, Roi: 2752x2754
Exp.: 80s @ 30FPS
Post: AI deconvolution + sharpen



AR 2837: Unipolar (α)
AR 2835: Bipolar in single penumbra (β-δ)
AR 2836: Bipolar simple (β)

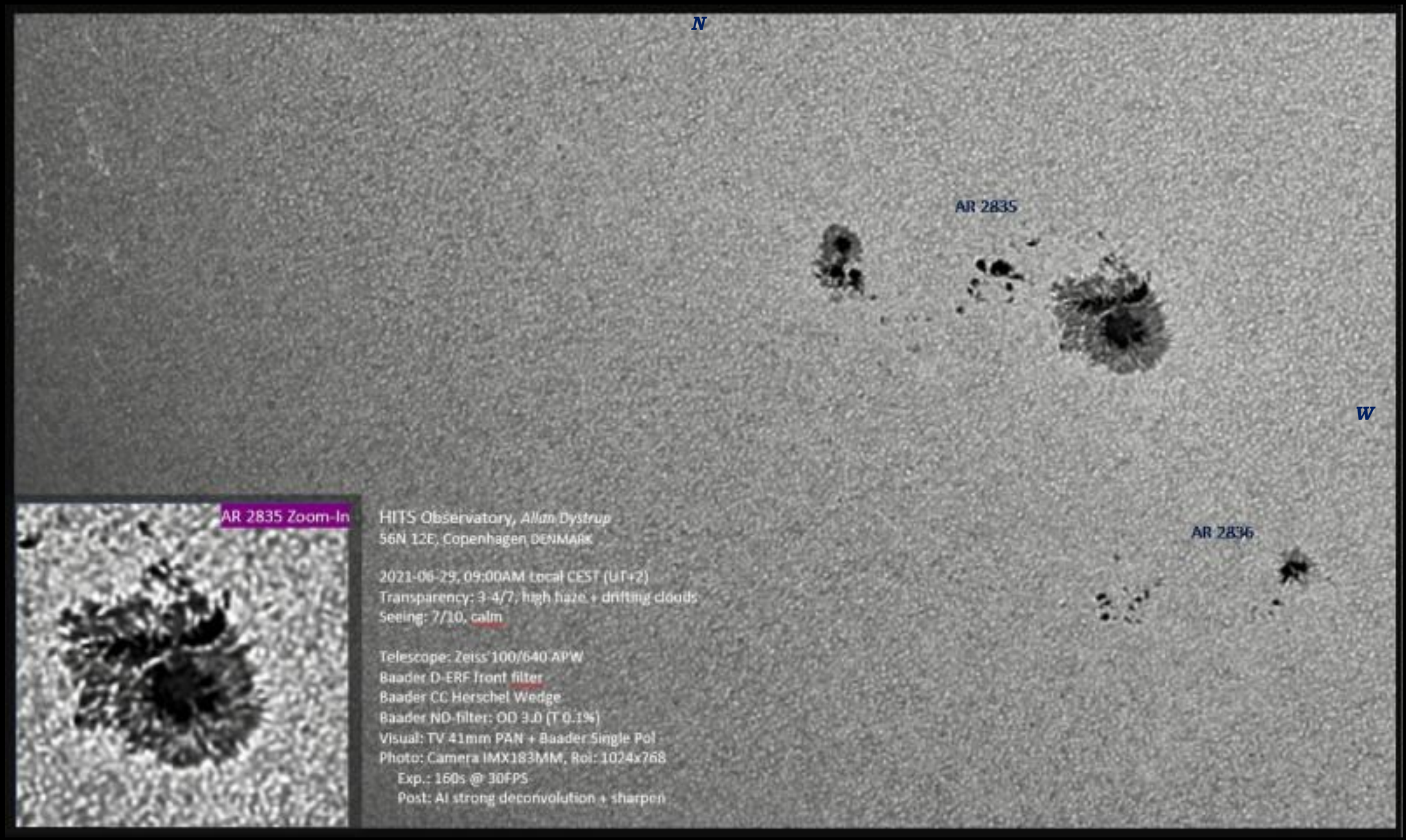
Sun in white light, 2021-06-29

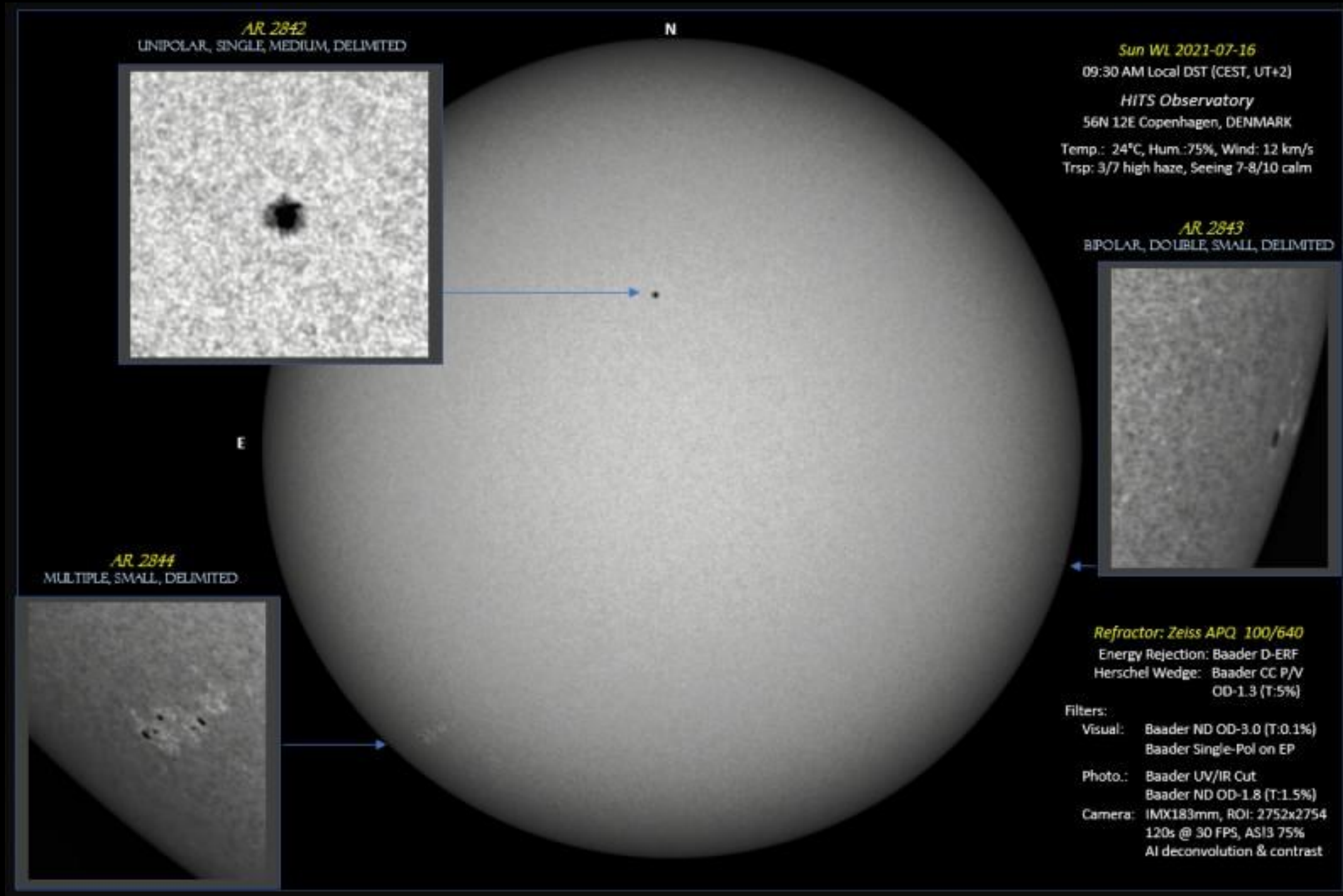
The sun is slowly winding up its magnetic field for solar cycle 25, and we now start to see active regions with sunspot sizes ~5dg (type K) in extended bipolar configurations (type F). A fine example right now is the **active region AR 2835** :

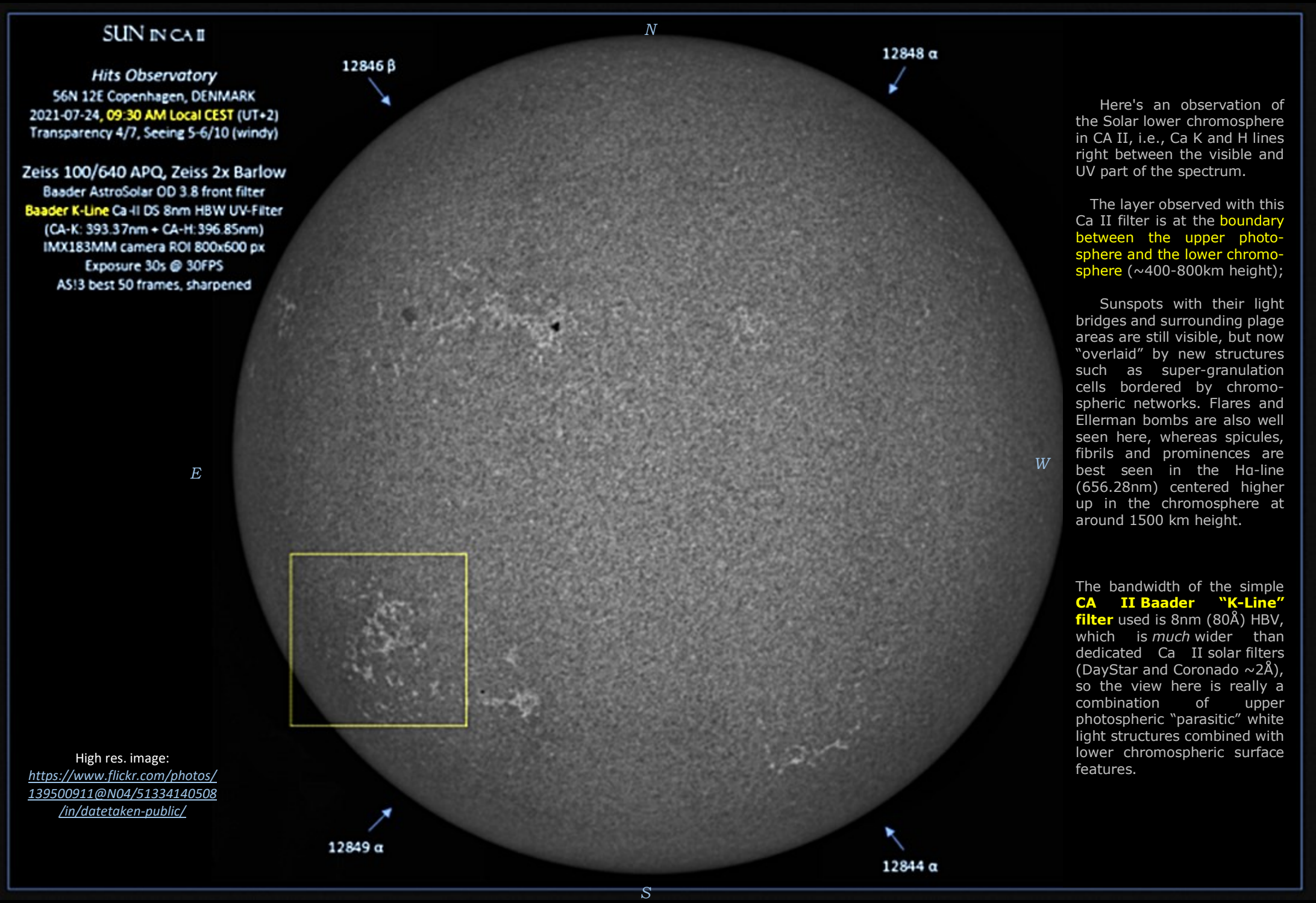
Full res. image:

https://www.flickr.com/photos/139500911@N04/51279142856/in/album-72157717067345722/

And a close-up: Sun in white light, 2021-06-29




AR 2842
UNIPOLAR, SINGLE, MEDIUM, DELIMITED
N
Sun WL 2021-07-16
09:30 AM Local DST (CEST, UT+2)
HITS Observatory
56N 12E Copenhagen, DENMARK
Temp.: 24°C, Hum.:75%, Wind: 12 km/s
Trsp: 3/7 high haze, Seeing 7-8/10 calm
AR 2843
BIPOLAR, DOUBLE, SMALL, DELIMITED
E
AR 2844
MULTIPLE, SMALL, DELIMITED
Refractor: Zeiss APQ 100/640
Energy Rejection: Baader D-ERF
Herschel Wedge: Baader CC P/V
OD-1.3 (T:5%)
Filters:
Visual: Baader ND OD-3.0 (T:0.1%)
Baader Single-Pol on EP
Photo.: Baader UV/IR Cut
Baader ND OD-1.8 (T:1.5%)
Camera: IMX183mm, ROI: 2752x2754
120s @ 30 FPS, ASI3 75%
AI deconvolution & contrast



High res. image:
https://www.flickr.com/photos/139500911@N04/51334140508/in/datetaken-public/

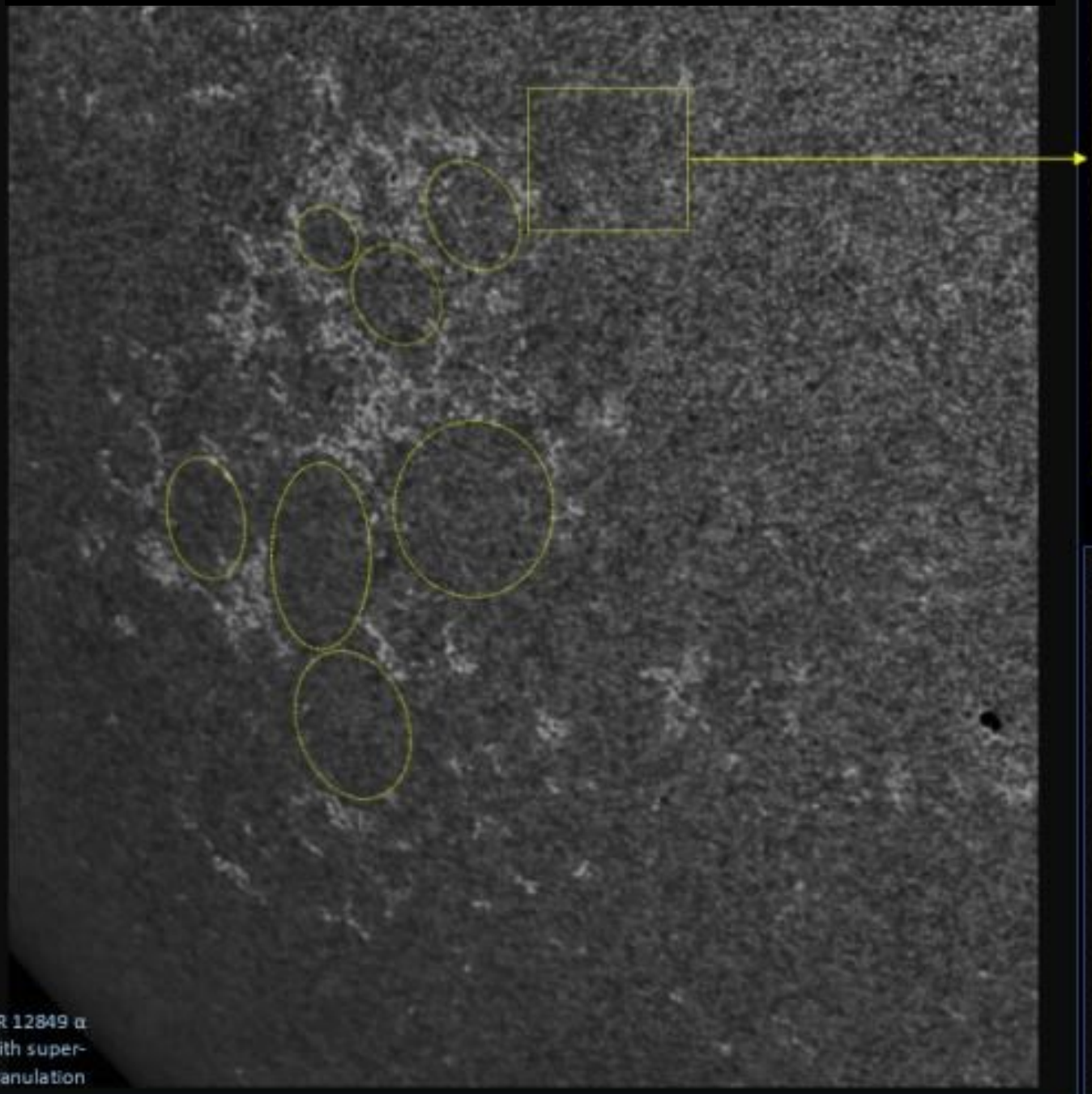
Here's an observation of the Solar lower chromosphere in CA II, i.e., Ca K and H lines right between the visible and UV part of the spectrum.

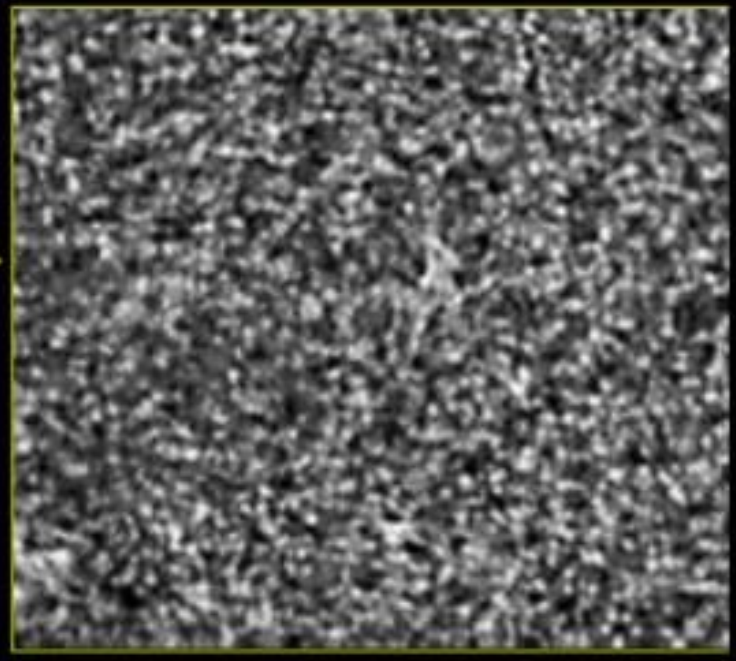
The layer observed with this Ca II filter is at the boundary between the upper photosphere and the lower chromosphere (~400-800km height);

Sunspots with their light bridges and surrounding plage areas are still visible, but now "overlaid" by new structures such as super-granulation cells bordered by chromospheric networks. Flares and Ellerman bombs are also well seen here, whereas spicules, fibrils and prominences are best seen in the Hα-line (656.28nm) centered higher up in the chromosphere at around 1500 km height.

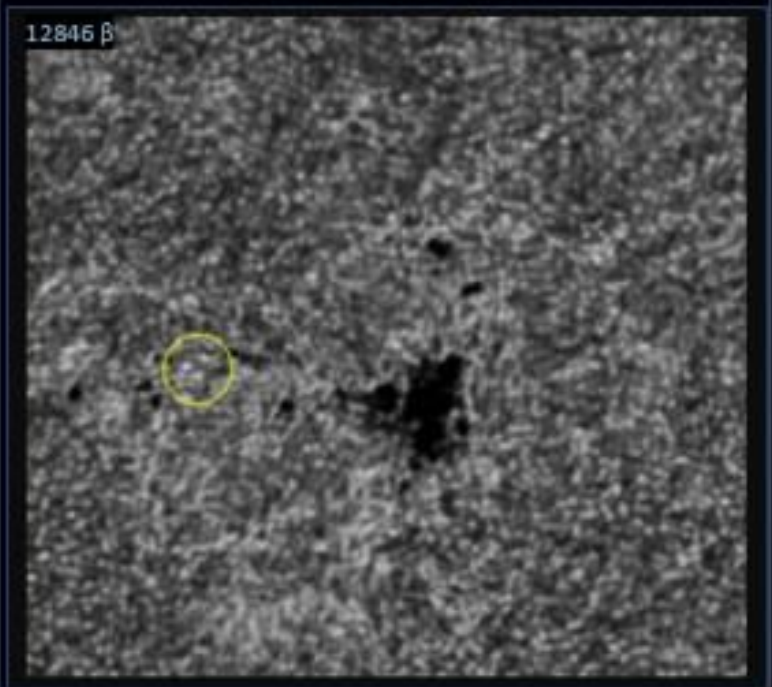
The bandwidth of the simple **CA II Baader "K-Line" filter** used is 8nm (80Å) HBV, which is *much* wider than dedicated Ca II solar filters (DayStar and Coronado ~2Å), so the view here is really a combination of upper photospheric "parasitic" white light structures combined with lower chromospheric surface features.

And a close-up of some of the K-Line features:



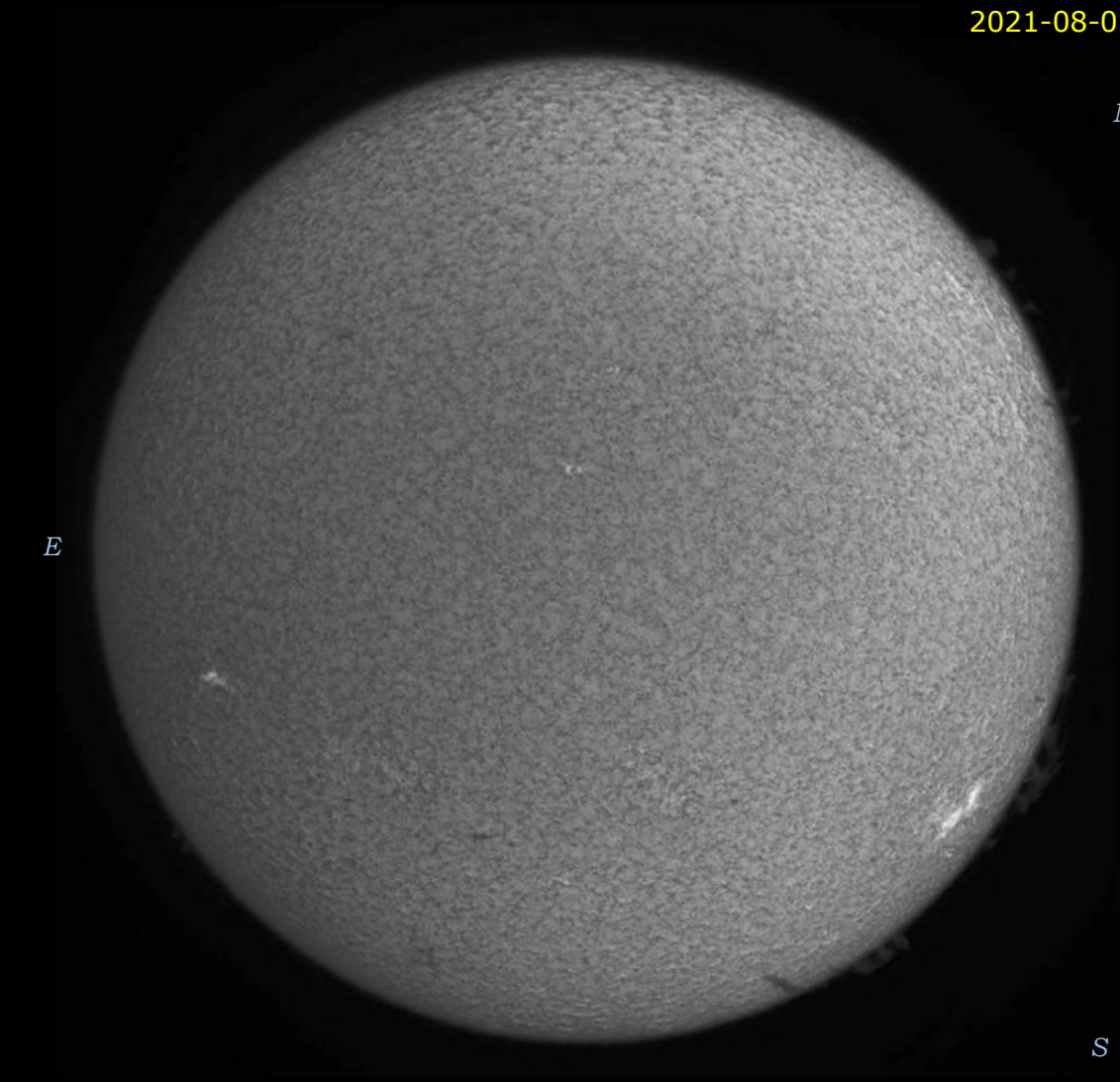


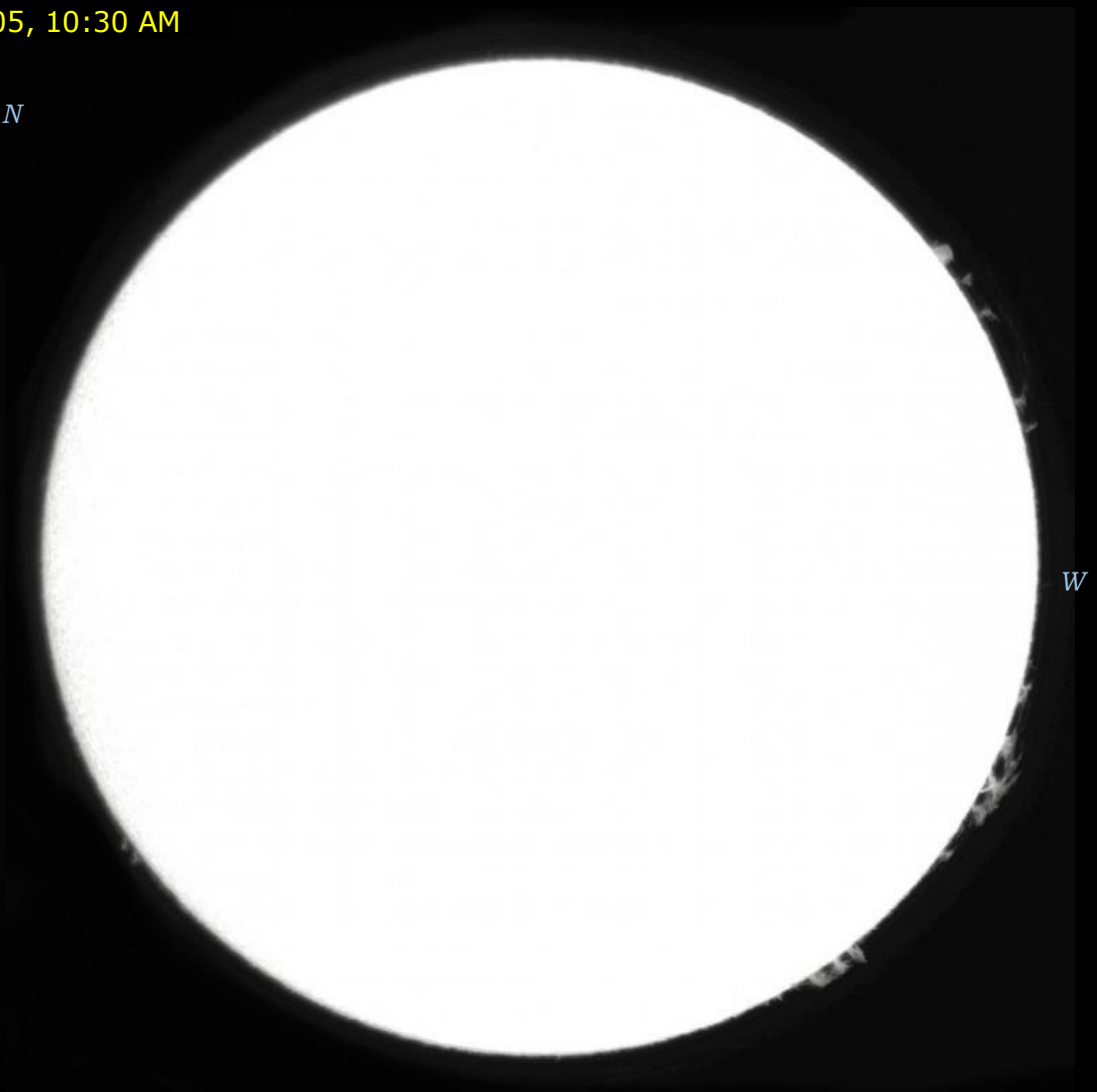
Upper photosphere granulation ^
Small Ellerman Bombs v



SUN in Ha

2021-08-05, 10:30 AM



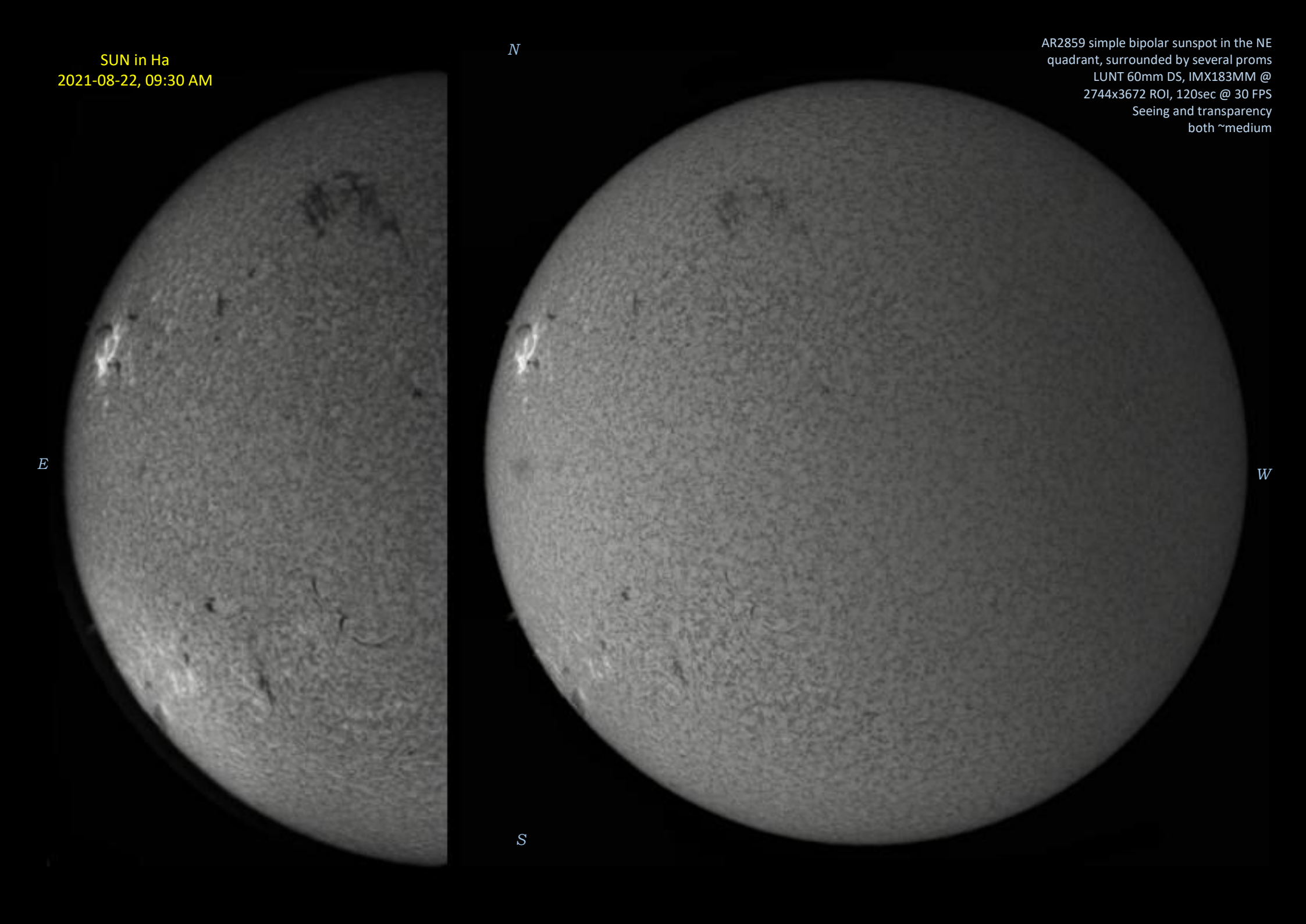


AS2850 unipolar Ha plage without sunspots in the SE quadrant, surrounded by several proms.

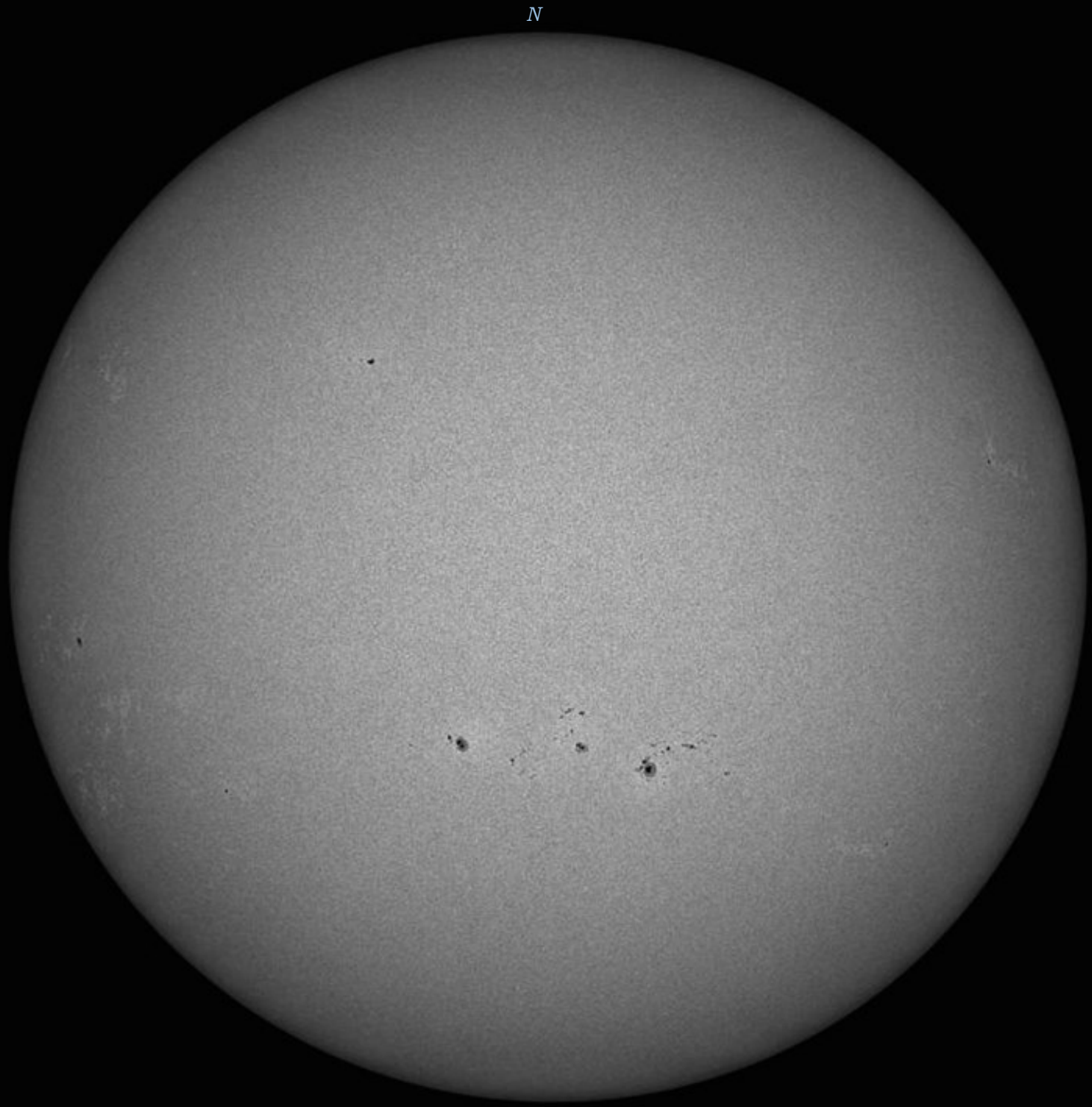
LUNT 60mm DS, IMX183MM @ 2752x2754 ROI, 120sec @ 30 FPS
Seeing and transparency both over medium

Full res. image:
https://www.flickr.com/photos/139500911@N04/51358995136/in/datetaken-public/

Same image, but gamma boosted to bring out the proms.


SUN in Ha
2021-08-22, 09:30 AM
N
E
W
S
AR2859 simple bipolar sunspot in the NE
quadrant, surrounded by several proms
LUNT 60mm DS, IMX183MM @
2744x3672 ROI, 120sec @ 30 FPS
Seeing and transparency
both ~medium

Some details from above observation:



First solar-spot train in Cycle 25

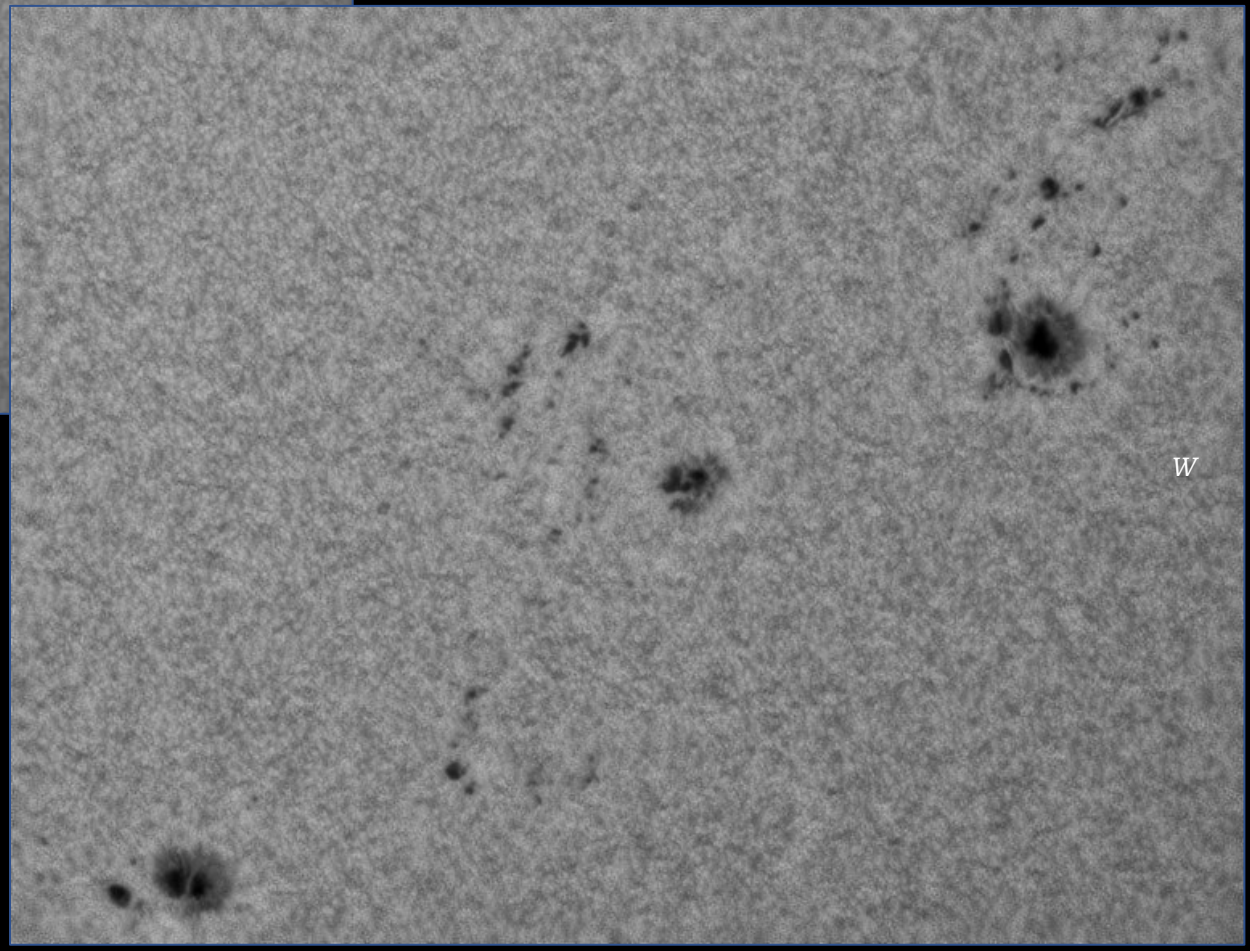
It's 10:30 AM on December 20. 2021, and I'm out in my suburban backyard just north of Copenhagen to observe the first train of good-size sunspots tracking across the solar surface here at the start of the 25. solar cycle.

The transparency is degraded quite a bit by the Sun being low at only ~8dg Alt. as seen here from 56dg N latitude in Denmark; -- But both transparency and seeing are around medium today, so why not give it a shot, anyway...

I have my 4" refractor mounted on the Ib pier, with an AstroSolar ND5 on the objective and a 2x barlow plus IMX183MM in the focuser (w/ green bandpass + UV/IR cut).

Here's first a full-face mugshot of the usual suspect.

And here a zoom-in on the central "wagons" in the train,
tracking west across the Solar prairie fire:

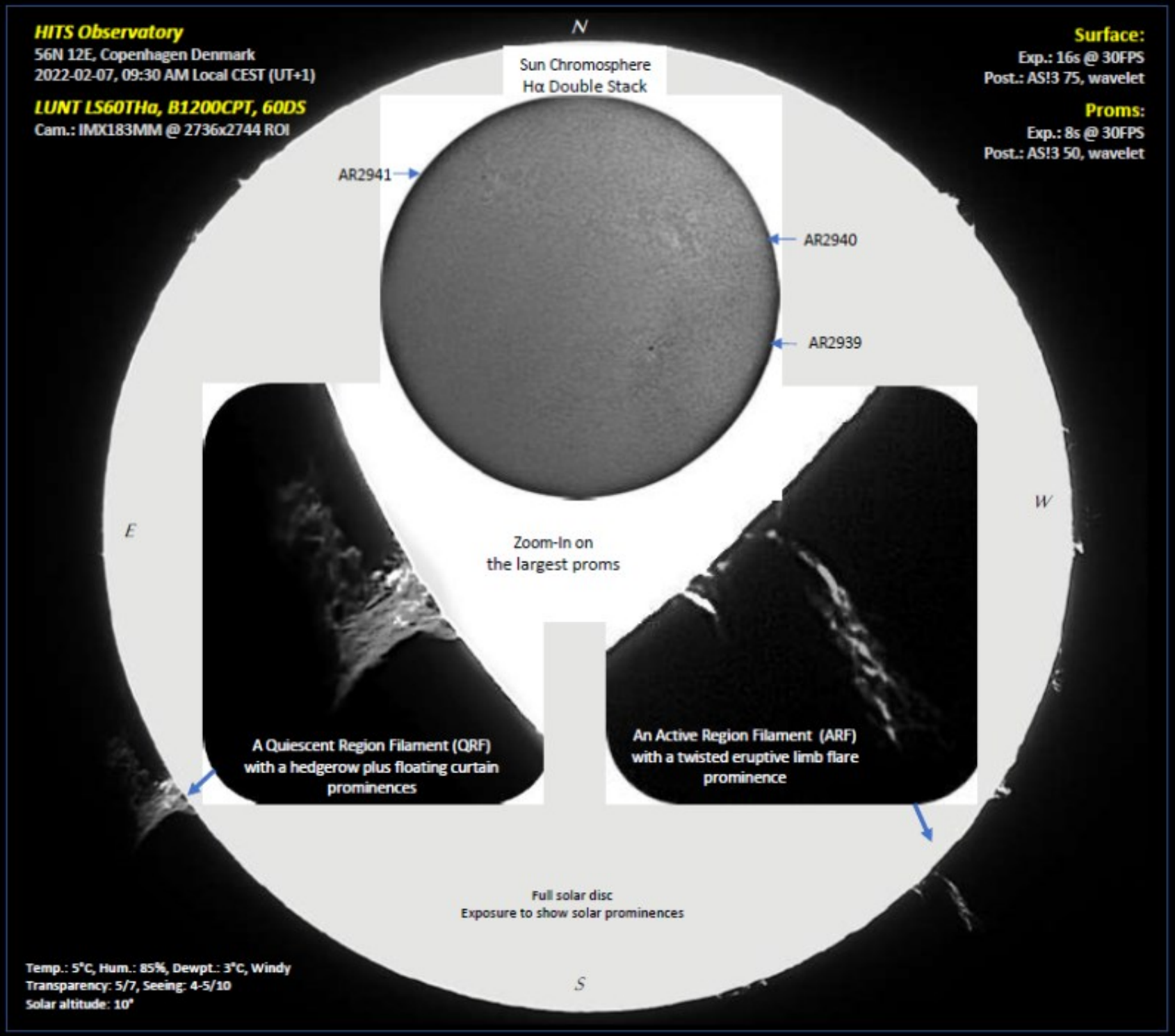


Sun 2022-02-07, 09:30 Local CEST (UT+1)

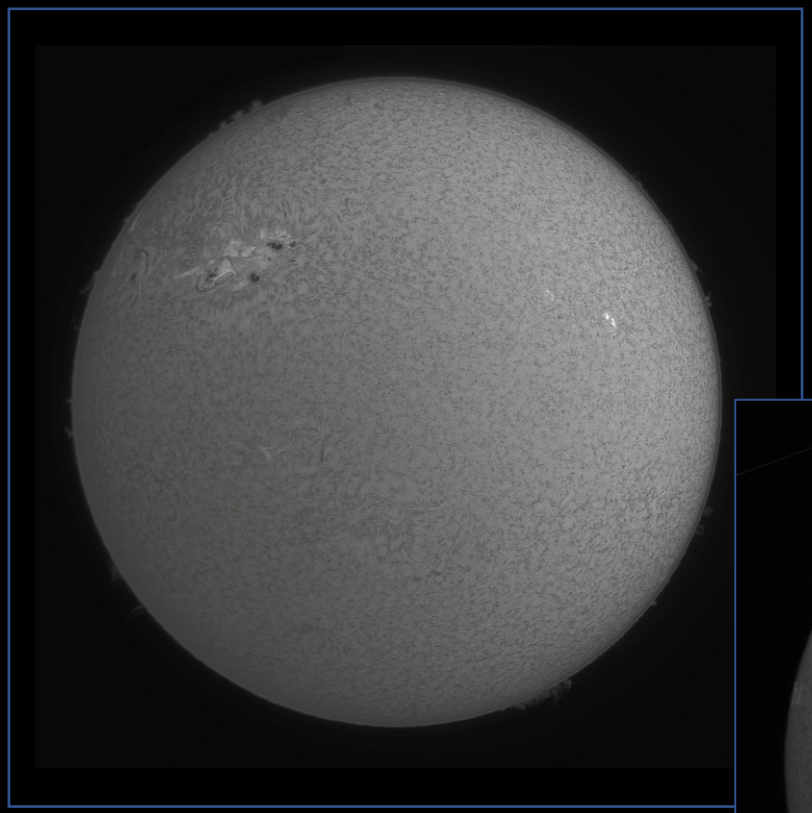
The transparency was medium, but the seeing was below medium due to low solar altitude and increasing wind during the observation.

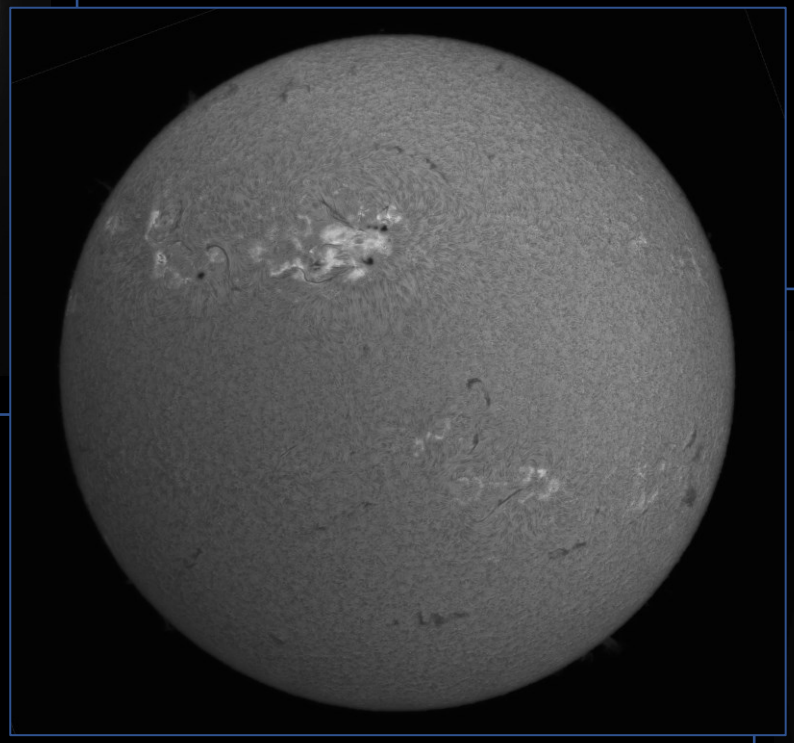
I focused on the solar proms, as the chromosphere details were too fuzzy to bother. The scope was my LUNT LS60THa, B1200CPT in 60DS mode, and the camera was the IMX183MM.

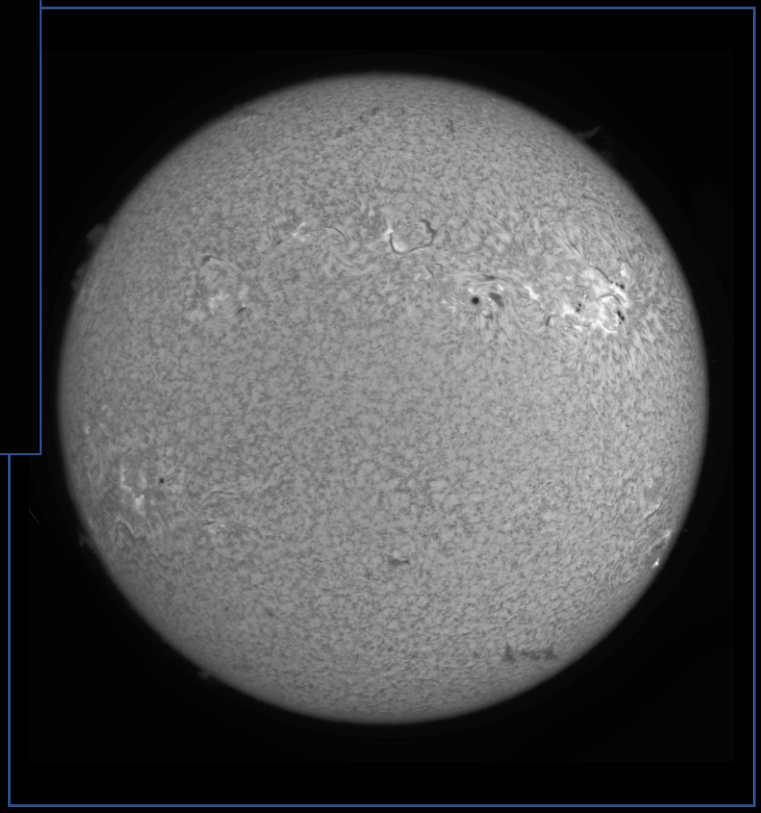
Here's a collage from the observation:

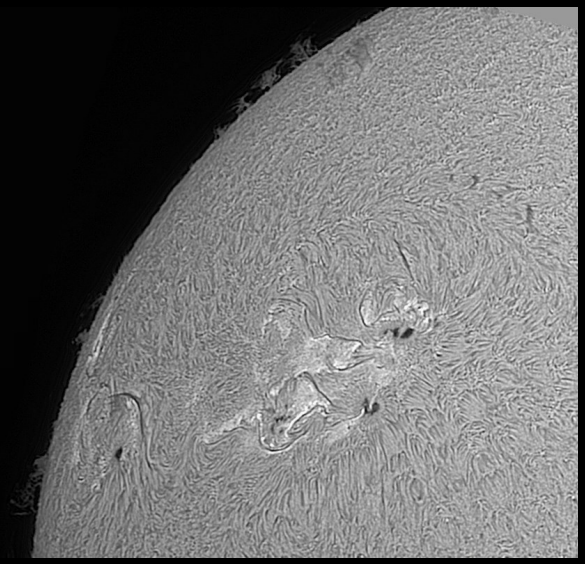


A suite of solar images in H-alpha
from late April 2022.



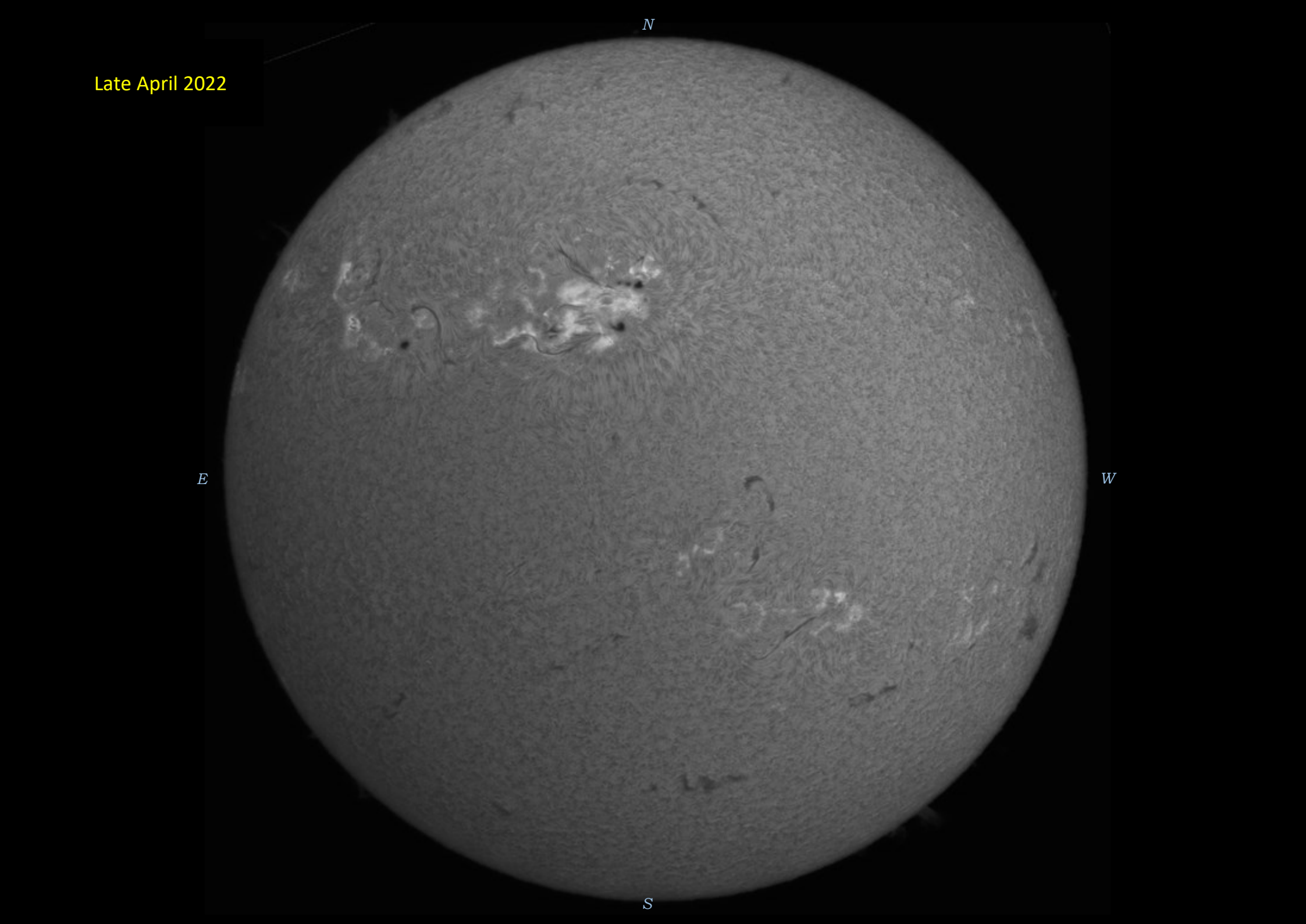




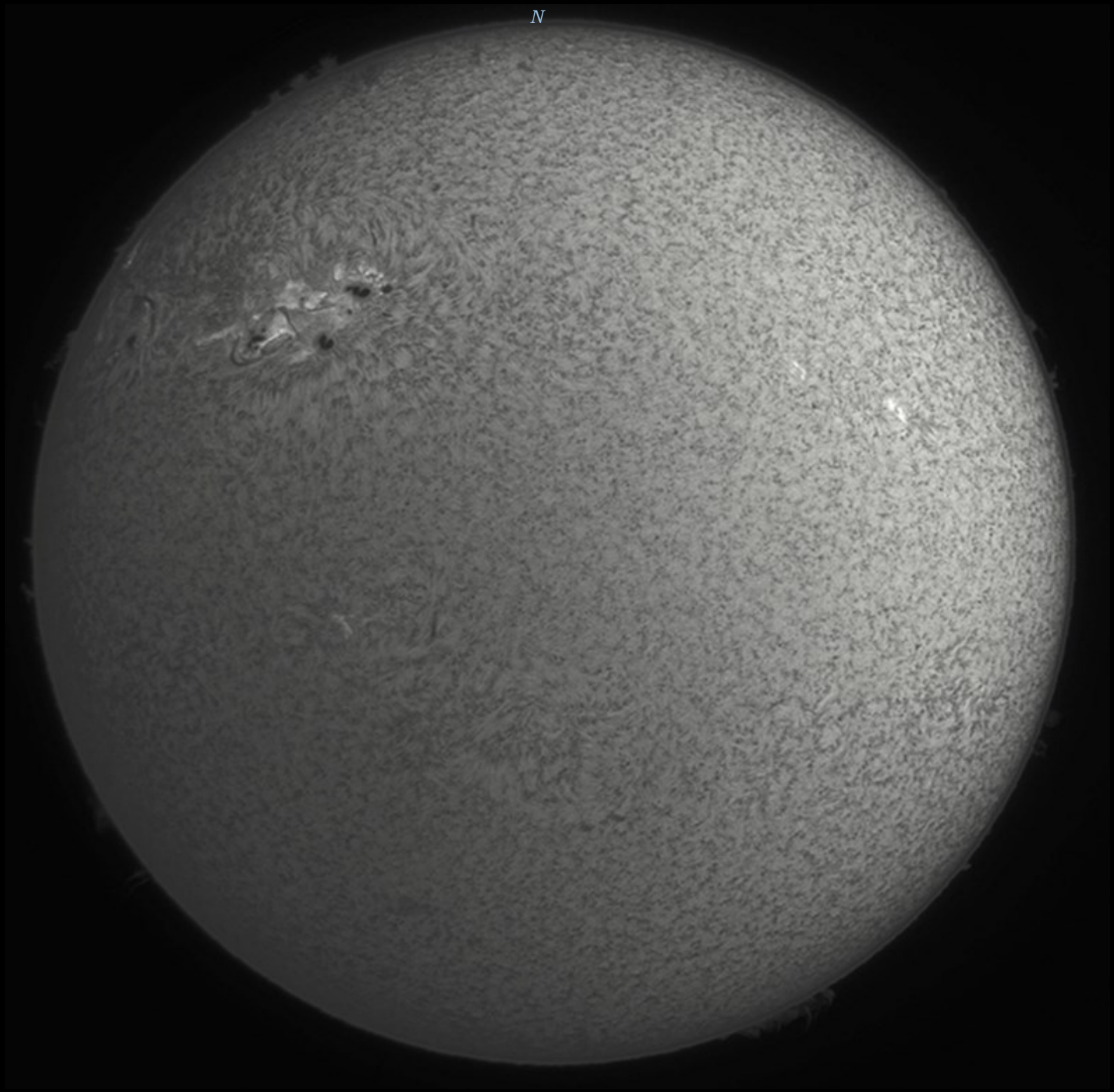


Solar scope LS60THaDS60/ B1200CPT
(60mm Ha + Double-Stack 60 Filter, B1200,
Crayford focuser and Pressure Tuner).

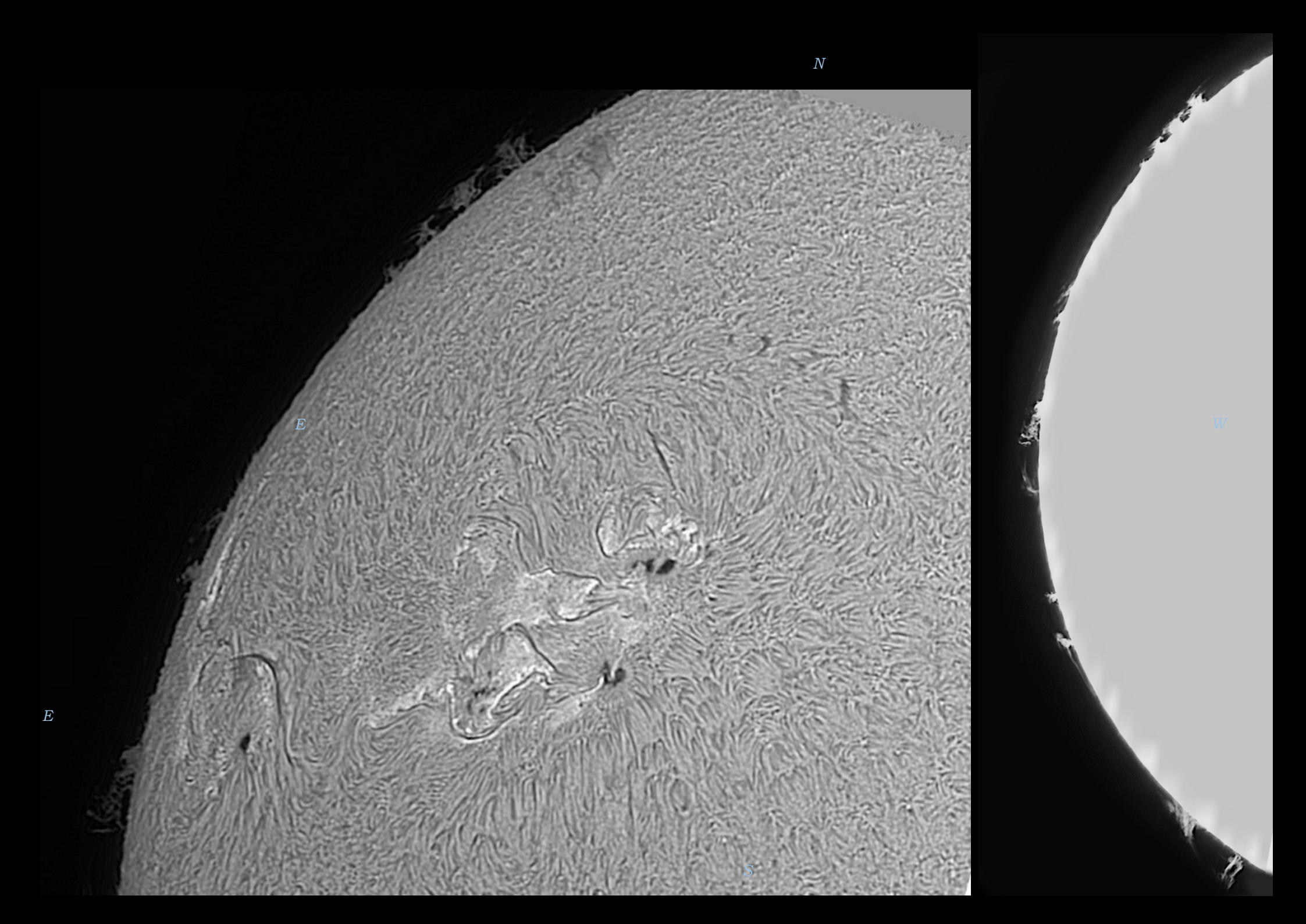
with camera ZWO ASI183mm, ROI 2752x2754 @ 30 FPS for 1 minute,
and post processing using AS!3 ~30% stack
deconvolution & wavelet in Astra Image.


Late April 2022
N
E
W
S

Whole disc sun in Ha
2022-04-20 AM,
60mm LUNT DS.



High res. image:
https://www.flickr.com/photos/139500911@N04/52022145219/in/datetaken-public/


N
E
E
S
W

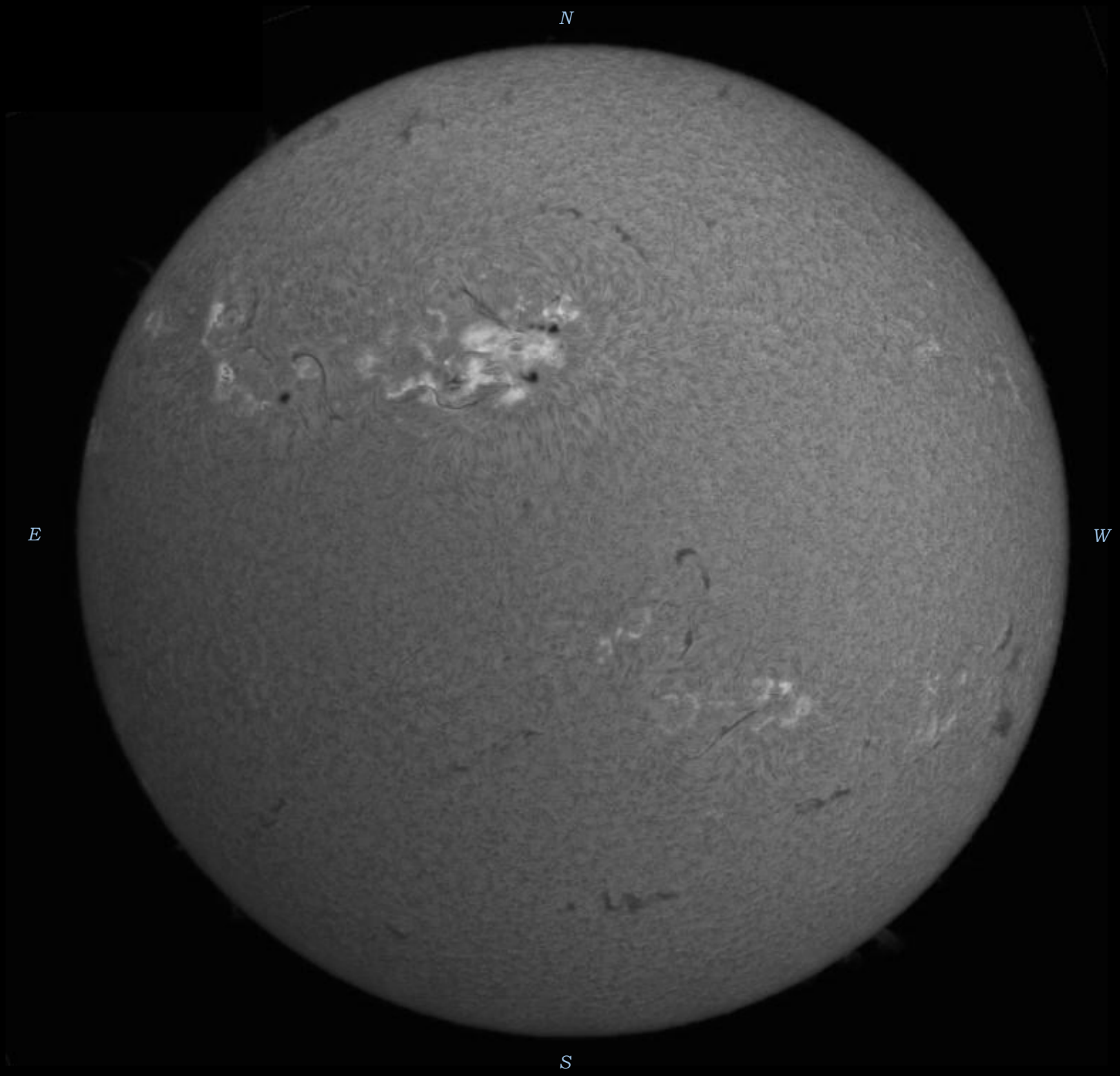
2022-04-22 AM

Whole disc sun in Ha,

60mm LUNT DS.

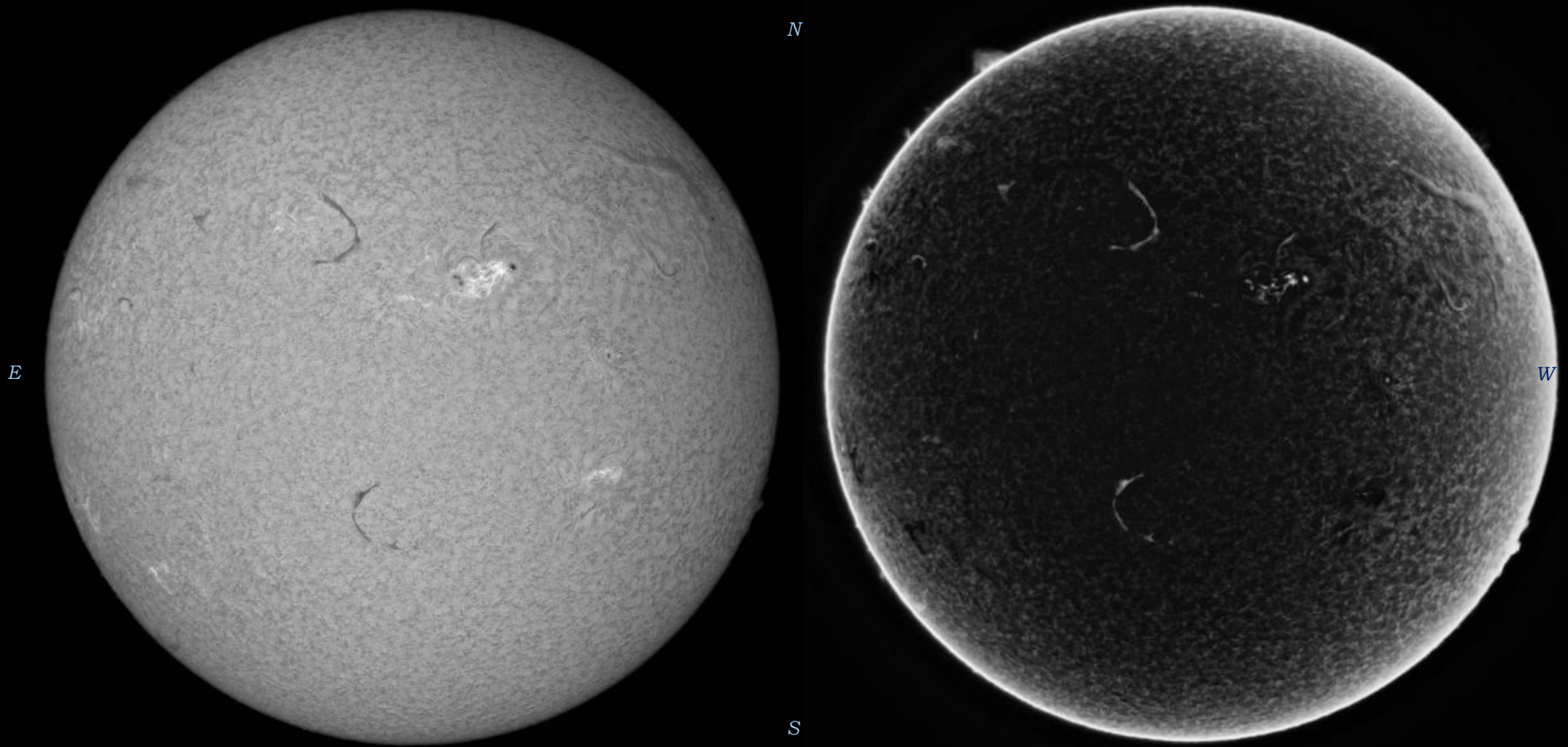
Clear with good transparency and medium seeing with some wind.

Full resolution with Pan & Zoom:
https://www.flickr.c...tetaken-public/

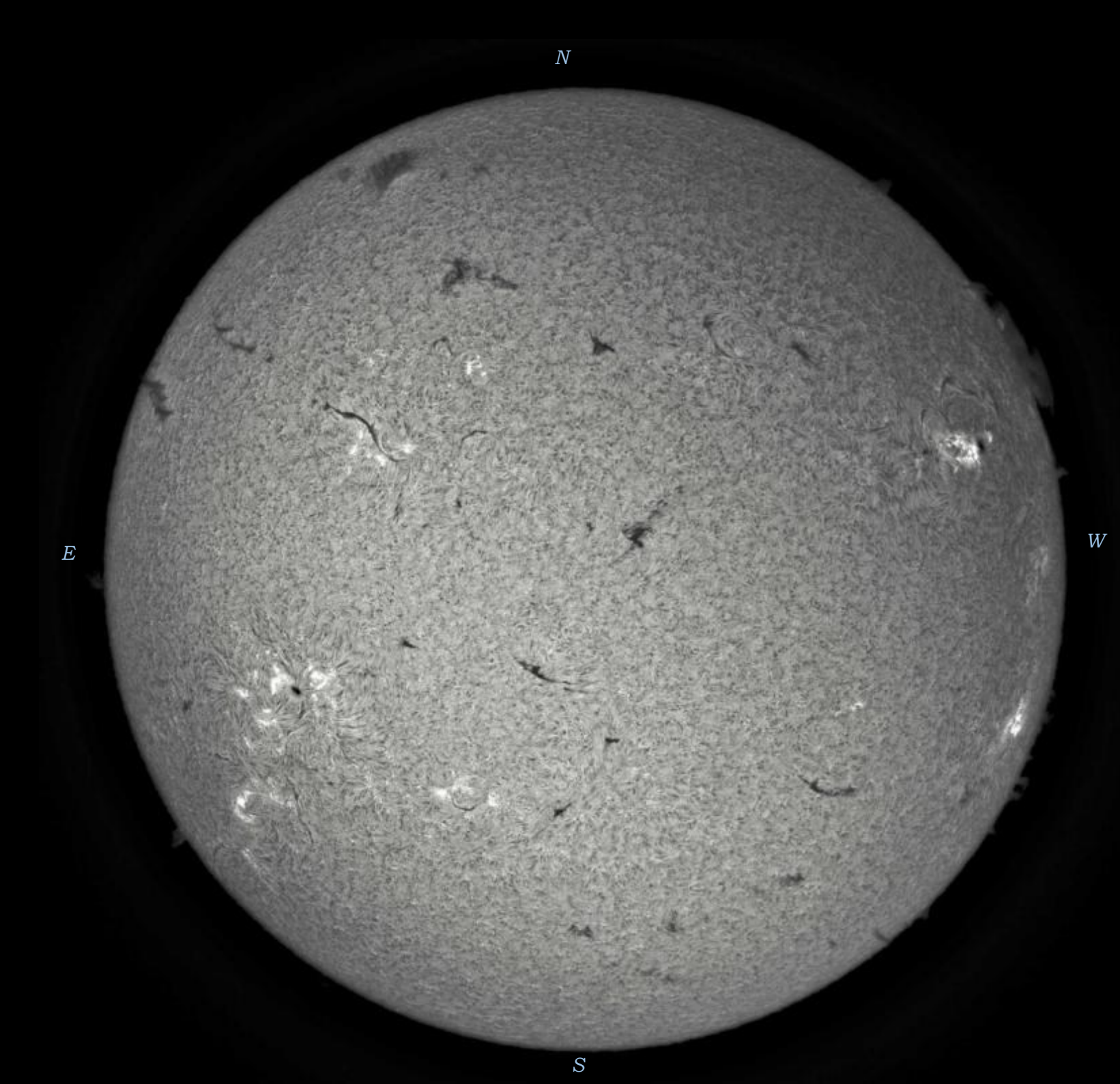


2022-06-26

We're just past mid-summer 2022, and the solar activity has been increasing the past month - not so much visible in white light (some sunspot and plage active regions), but many interesting filaments and proms observable in the H-alpha part of the spectrum. Here are a couple of observations from late June this year:



Telescope: LUNT 60mm double stack (LS60 THa DS60 / B1200 CPT)
Camera: IMX 183MM, ROI 2752 x 2754, Exposure 90s @ 30 FPS.LUNT
The scope was not quite on-band here



2022-06-29

And this observation is 3 days later; Note the long filament in the NW quadrant from the previous observation, which has now rotated out as a large quiescent prominence on the NW solar limb.

High res. image:
https://www.flickr.com/photos/139500911@N04/52169795449/in/album-72157719409812937/

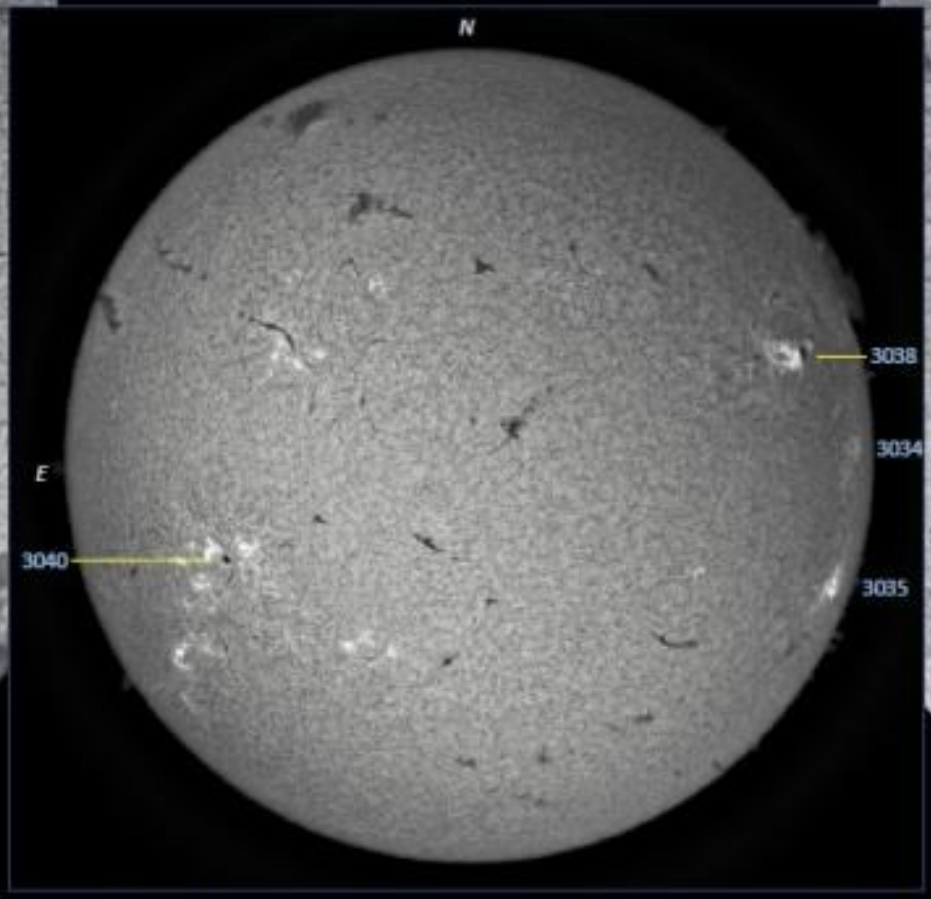
Telescope: LUNT 60mm double stack (LS60 THa DS60 / B1200 CPT), Camera: IMX 183MM, ROI 2752 x 2754, Exposure 90s @ 30 FPS.

This observation is very close to being on-band.

Sun in Hα

Friday June 24, 2022, 12:10 PM Local DST CEST (GMT+2)
56N 12E, Copenhagen Denmark; Slightly windy with drifting cumulus clouds.

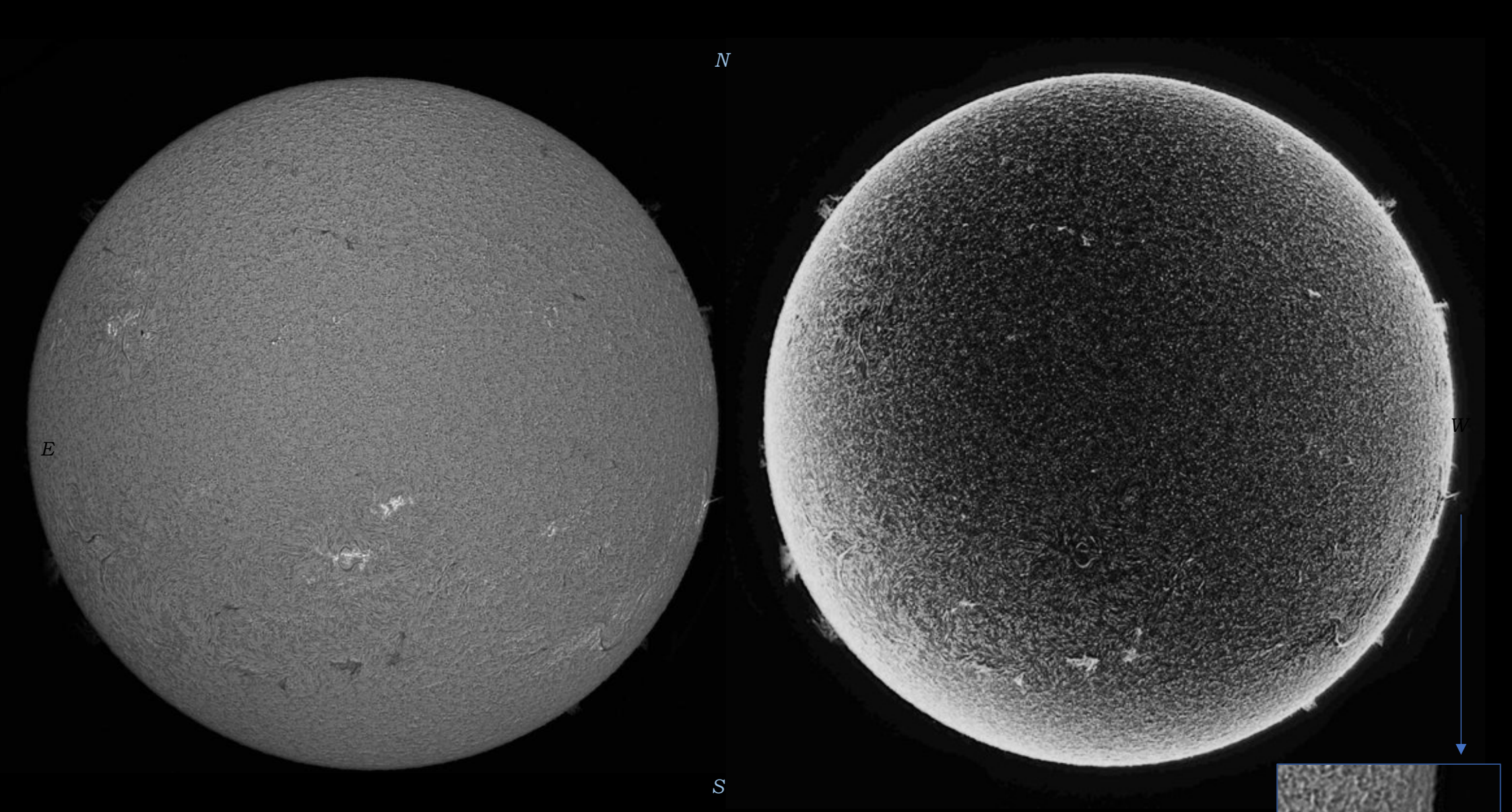
Telescope: LUNT 60mm double stack (LS60 THa DS60 / B1200 CPT)
Camera: IMX 183MM, ROI 2752 x 2754, Exposure 90s @ 30 FPS.



The LS60THaDS60 system has a bandwidth/FWHM of ~0.5 Angstroms @ 656 nm

When on band, it shows nice filamentary fibrils around the umbrae of the active area and an obvious chromospheric fringe at the limb. There's only a hint of a double limb (caused by photospheric leak) and groups of spicules in the chromospheric fringe are coarsely resolved in my 60mm scope.

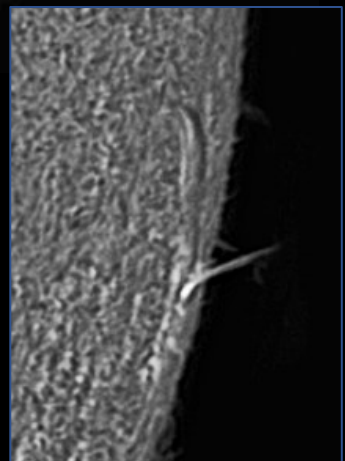
When tuned a bit off the center line, groups of spicules on the solar disc can be observed as waves ('hedges') marking the boundaries between supergranulation cells. The hedges are most obvious in my small scope when seen 'in profile' nearing the solar limb. Some ribbon flares and bright spots caused by magnetic loops and condensations can also be seen in the active regions around the sun spots. Several filaments are seen in dark profile towards the solar disc, and a few were seen as quiescent prominences, like giant slugs slowly crossing the limb.



2022-07-03, 09:40 Local DST, UT+2
A solar observation in Ha from yesterday AM

Telescope: LUNT 60mm double stack (LS60 THa DS60 / B1200 CPT)
Camera: IMX 183MM, ROI 2752 x 2754, Exposure 90s @ 30 FPS.

Transparency: 3-4/7, drifting cumulus clouds. A little windy at times.



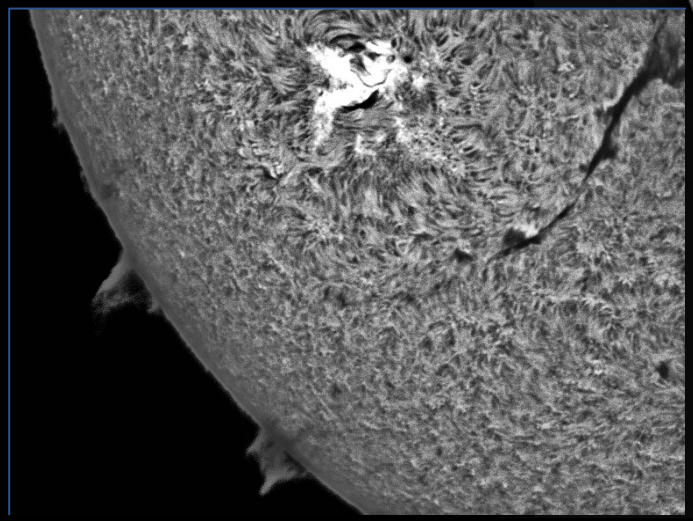
Sun in Hα
Mid-July 2022

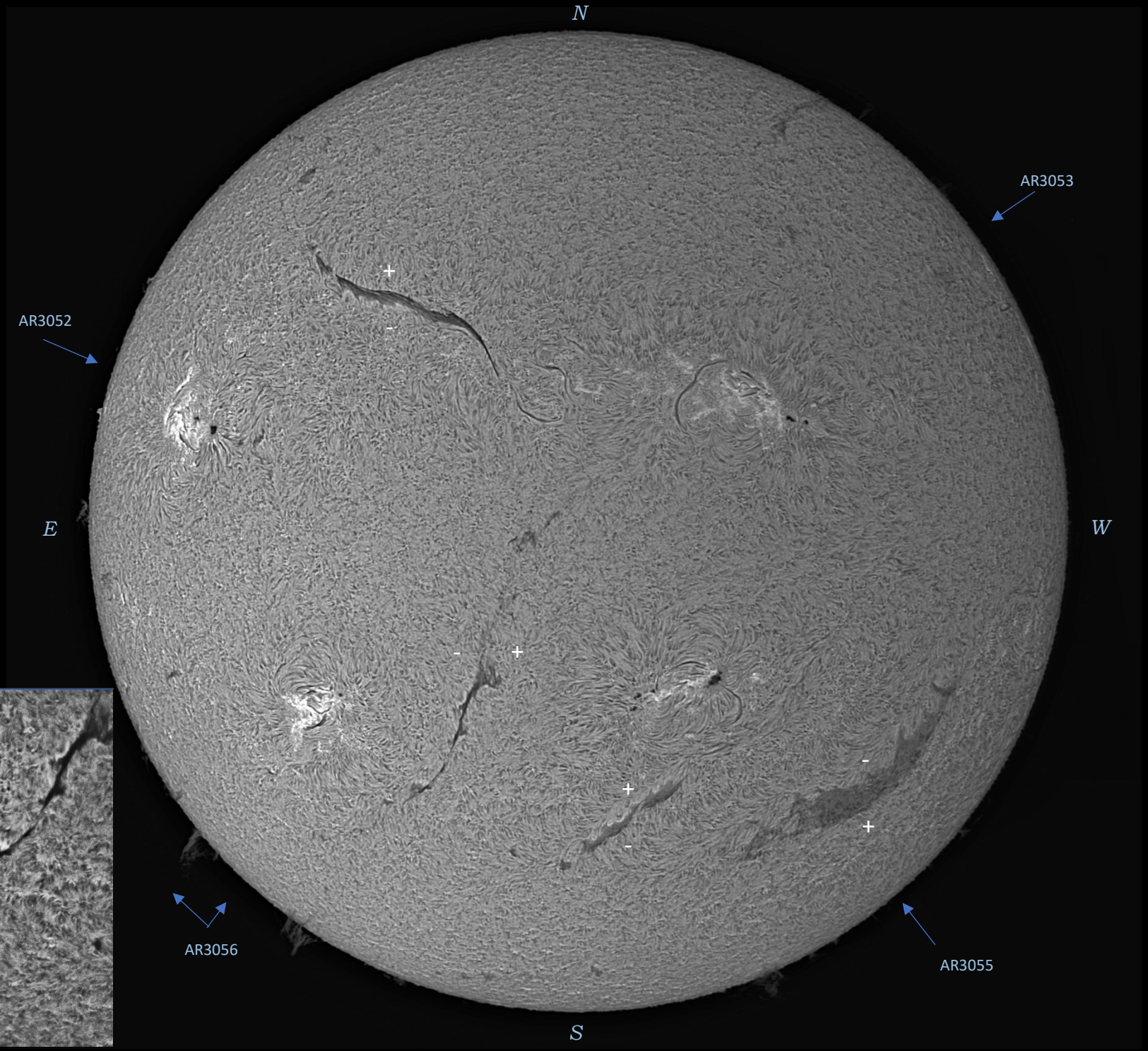
Location: 56N 12E, Copenhagen DENMARK
2022-July-13, 07:45 AM Local CEST (UT+2)

Telescope: LUNT 60mm double stack
(LS60 THa DS60 / B1200 CPT)
Bandwidth/FWHM ~0.5 Angstroms @ 656 nm

Camera: ZWO ASI IMX 183MM, ROI 2752 x 2754,
Exposure 100s @ 30 FPS (3000 frames)

Post-Proc.: SharpCap 4.0 stack 25%
Astra Image: LR deconvolution
PSP: flip/rotation & brightness/contrast

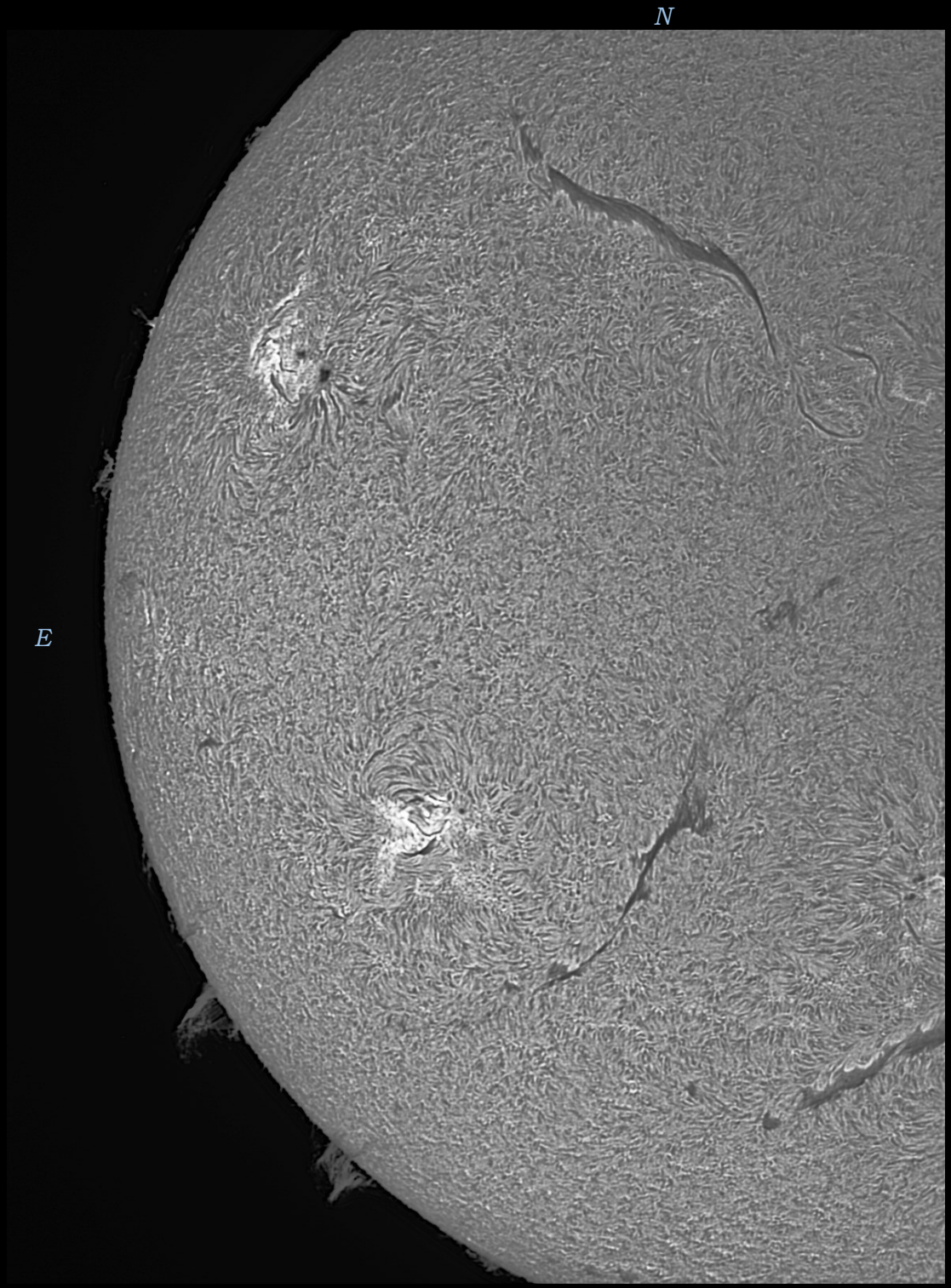


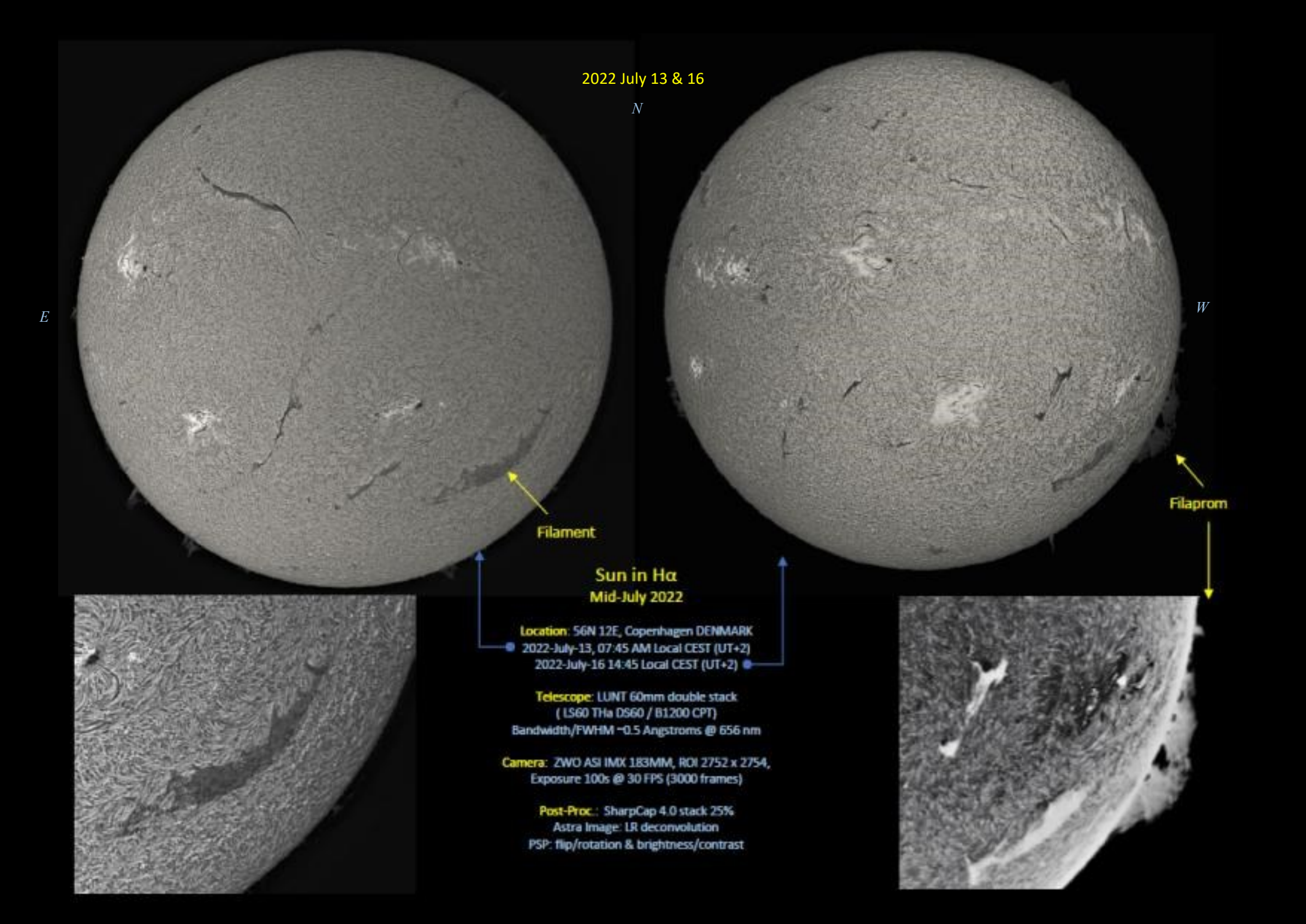


July 13. ~08 AM,
Close-up
as viewed in my 60mm LUNT solar scope.

A few drifting clouds and a bit windy at times.

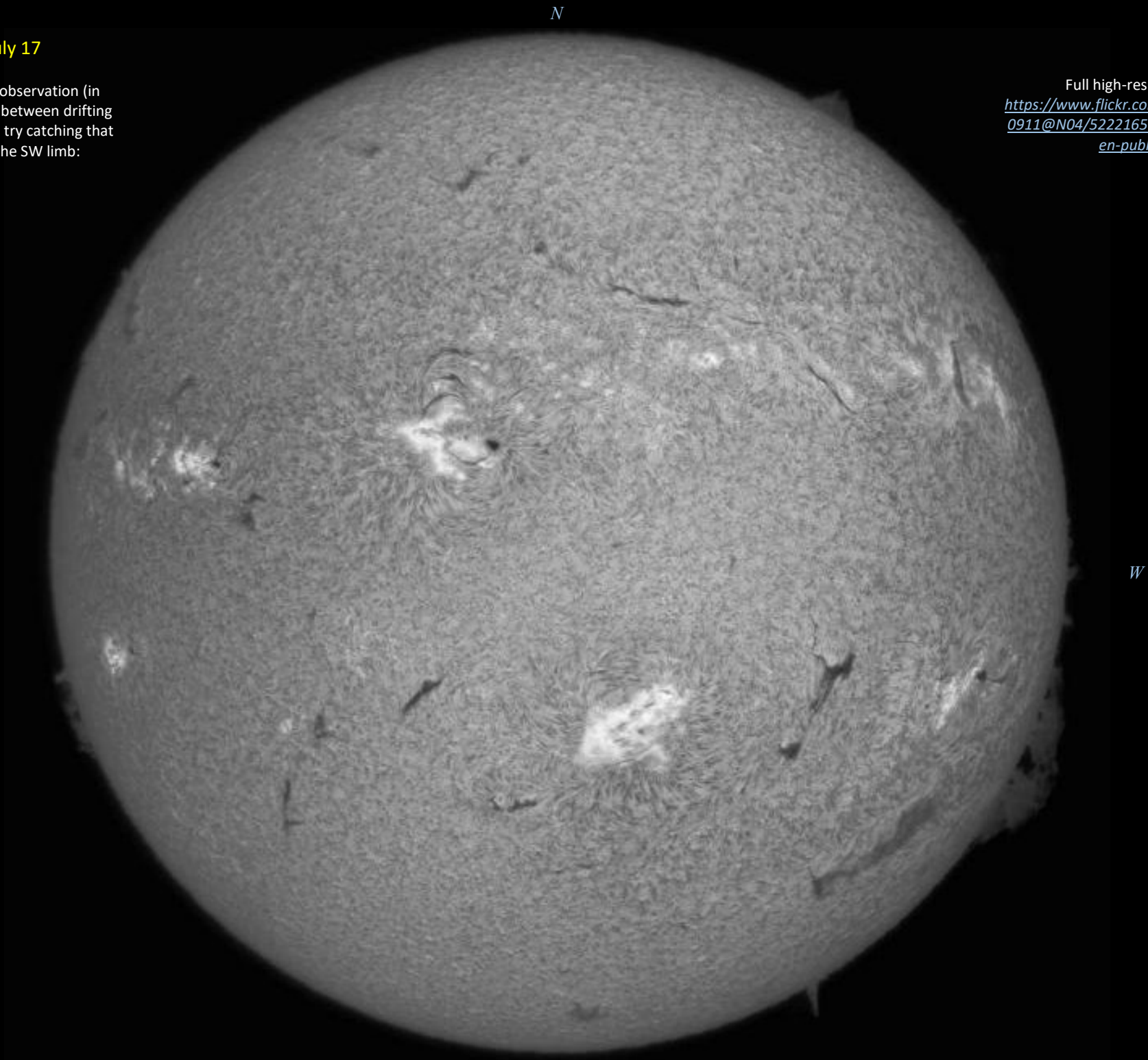
Lots of activity with the 4 active regions and plasma
"hung up to dry" on the magnetic fields in between.



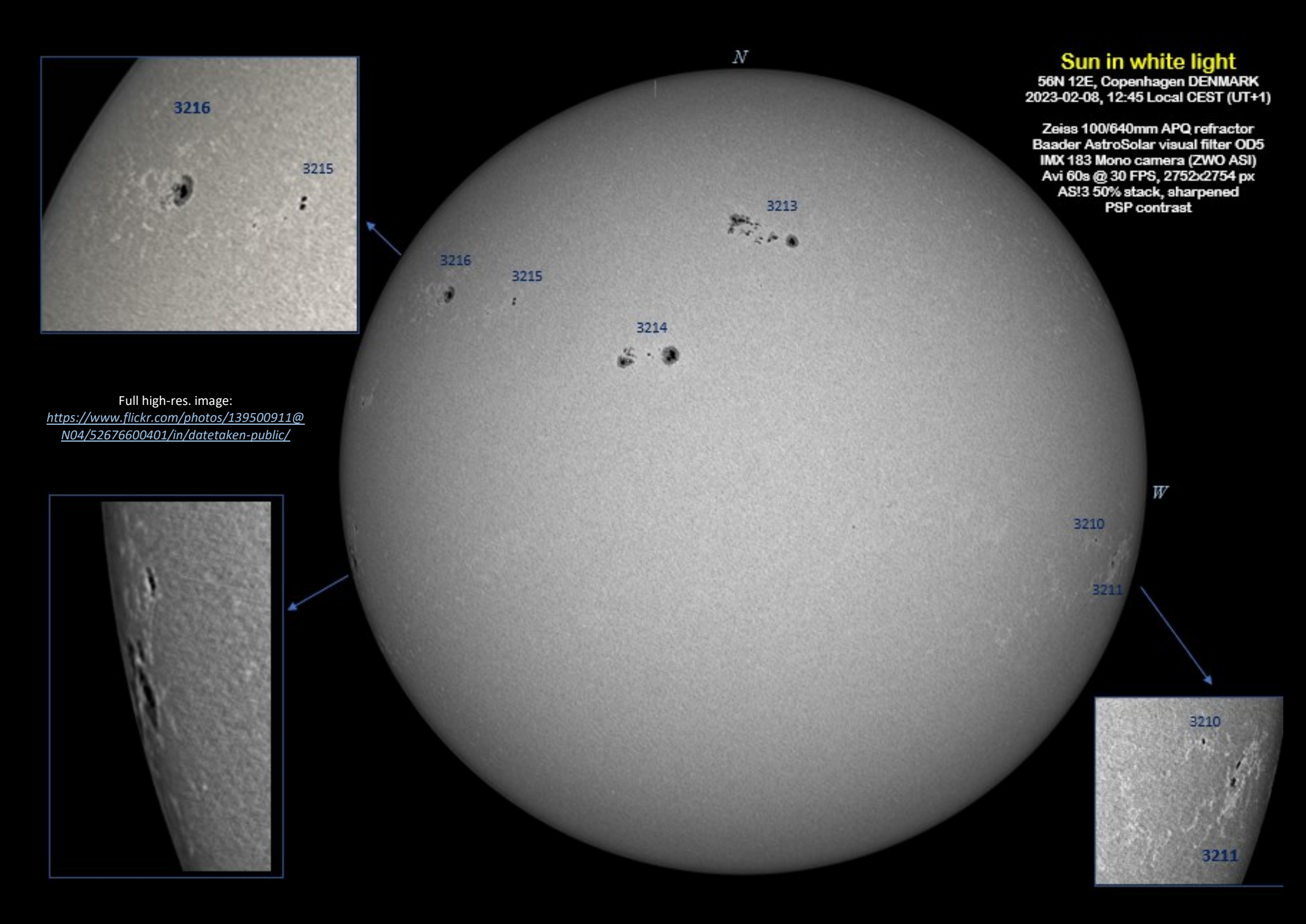

2022 July 13 & 16
N
E
W
Filament
Filaprom
Sun in Hα
Mid-July 2022
Location: 56N 12E, Copenhagen DENMARK
2022-July-13, 07:45 AM Local CEST (UT+2)
2022-July-16 14:45 Local CEST (UT+2)
Telescope: LUNT 60mm double stack
(LS60 THa DS60 / B1200 CPT)
Bandwidth/FWHM ~0.5 Angstroms @ 656 nm
Camera: ZWO ASI IMX 183MM, ROI 2752 x 2754,
Exposure 100s @ 30 FPS (3000 frames)
Post-Proc.: SharpCap 4.0 stack 25%
Astra Image: LR deconvolution
PSP: flip/rotation & brightness/contrast

2022 July 17

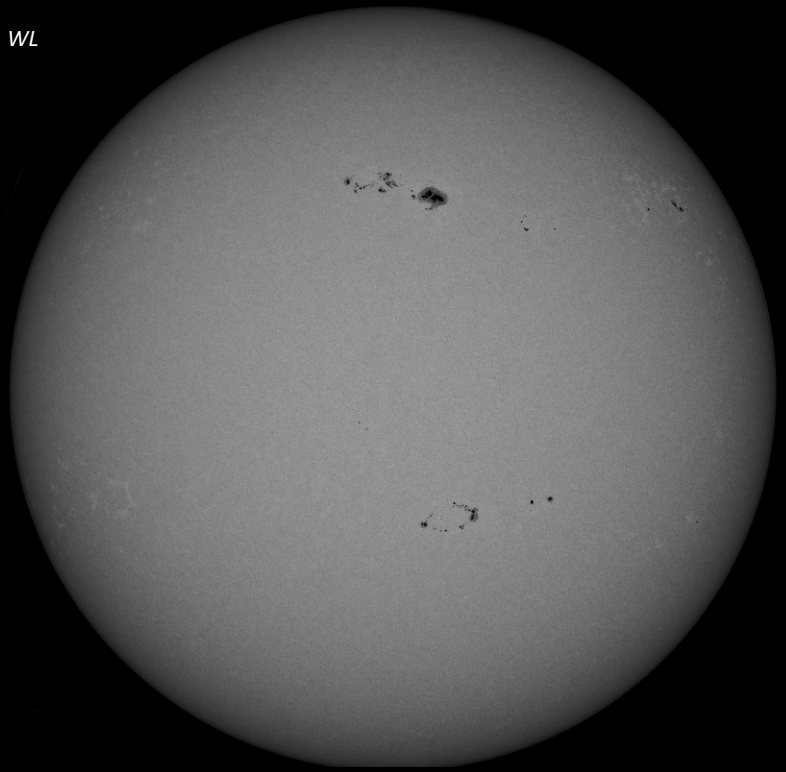
Here's my latest observation (in windy weather and between drifting clouds), but I had to try catching that large prom at the SW limb:



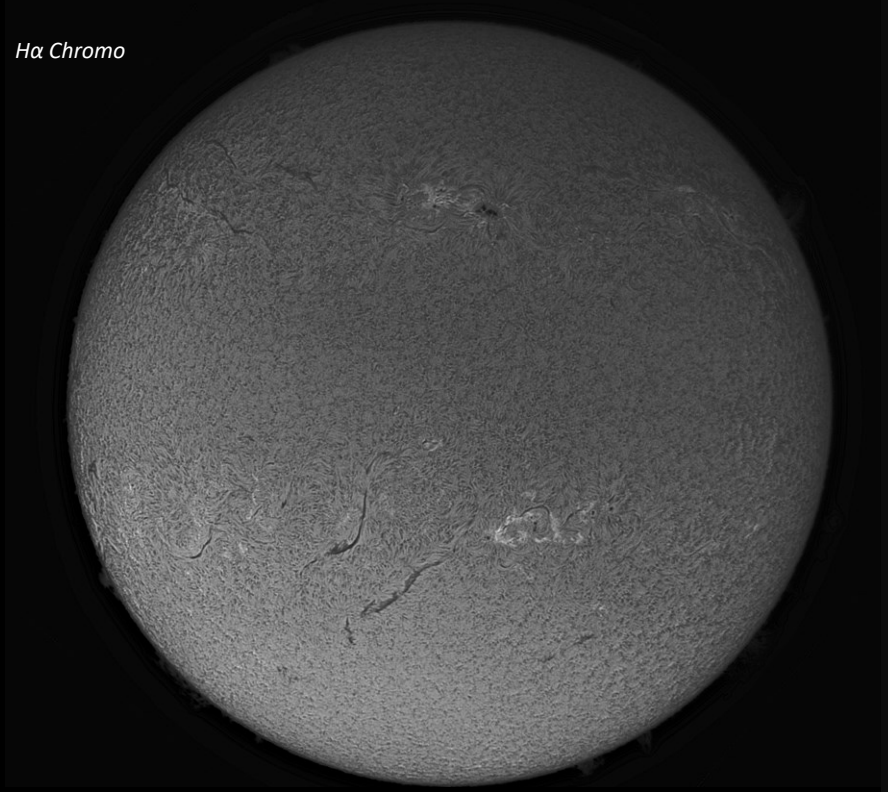
Full high-res. image:
https://www.flickr.com/photos/139500911@N04/52221657148/in/datetaken-public/


Sun in white light
56N 12E, Copenhagen DENMARK
2023-02-08, 12:45 Local CEST (UT+1)
Zeiss 100/640mm APQ refractor
Baader AstroSolar visual filter OD5
IMX 183 Mono camera (ZWO ASI)
Avi 60s @ 30 FPS, 2752x2754 px
AS!3 50% stack, sharpened
PSP contrast
N
W
3216
3215
3213
3214
3210
3211
Full high-res. image:
https://www.flickr.com/photos/139500911@N04/52676600401/in/datetaken-public/

WL



Hα Chromo

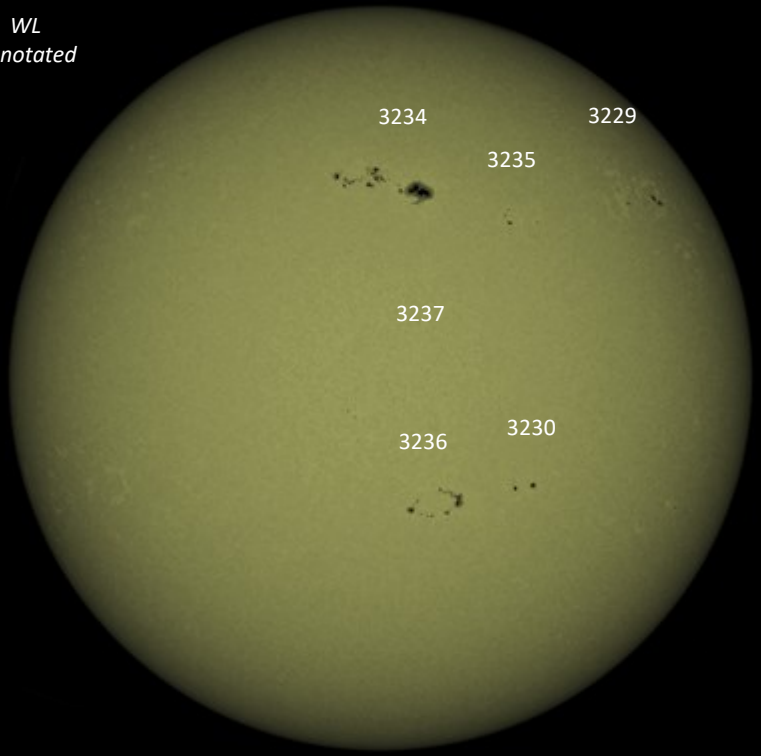


SUN
2023-02-26 11:30 – 12:30
Local CEST DST (UT+2)

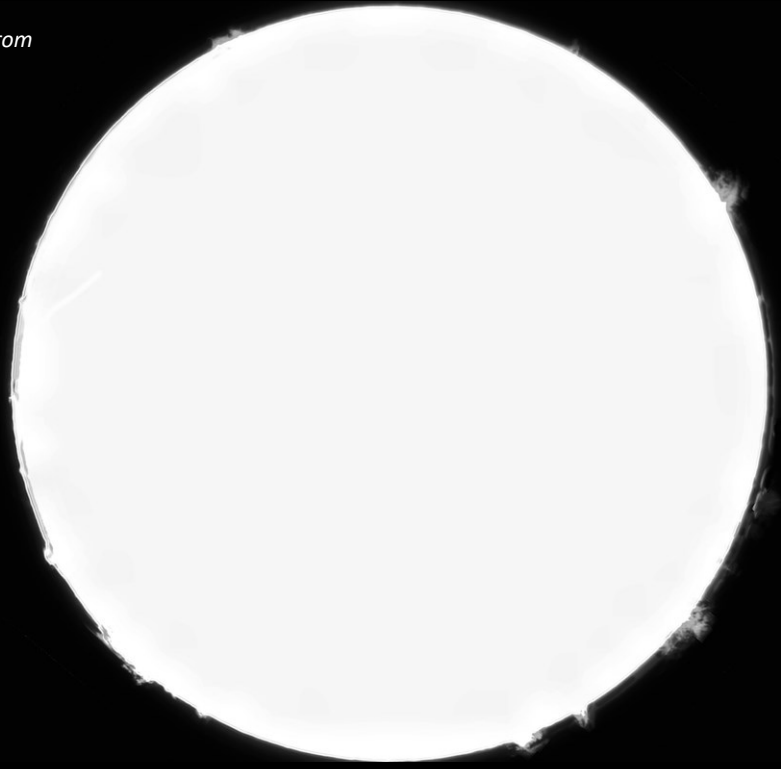
White Light:
Zeiss 100/640 APQ
Baader D-ERF front filter
Baader CC Herschel wedge
With OD3 ND Filter

H alpha (<0.55 A bandwidth):
Lunt LS60THaDS60 + B1200 Block
Chromosphere & Prom tuning

WL
Annotated

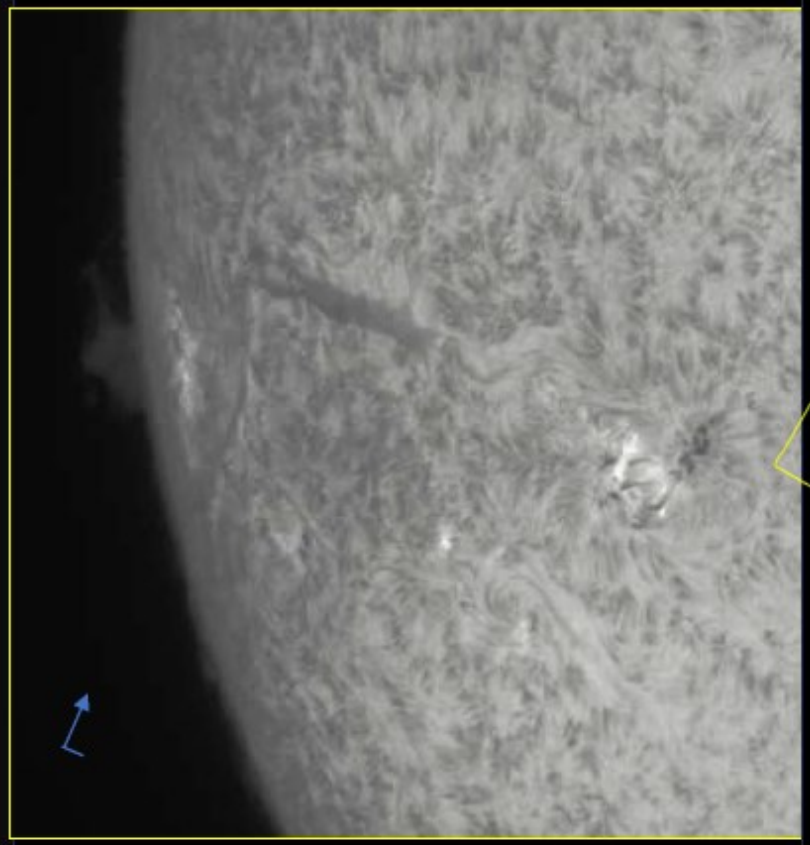


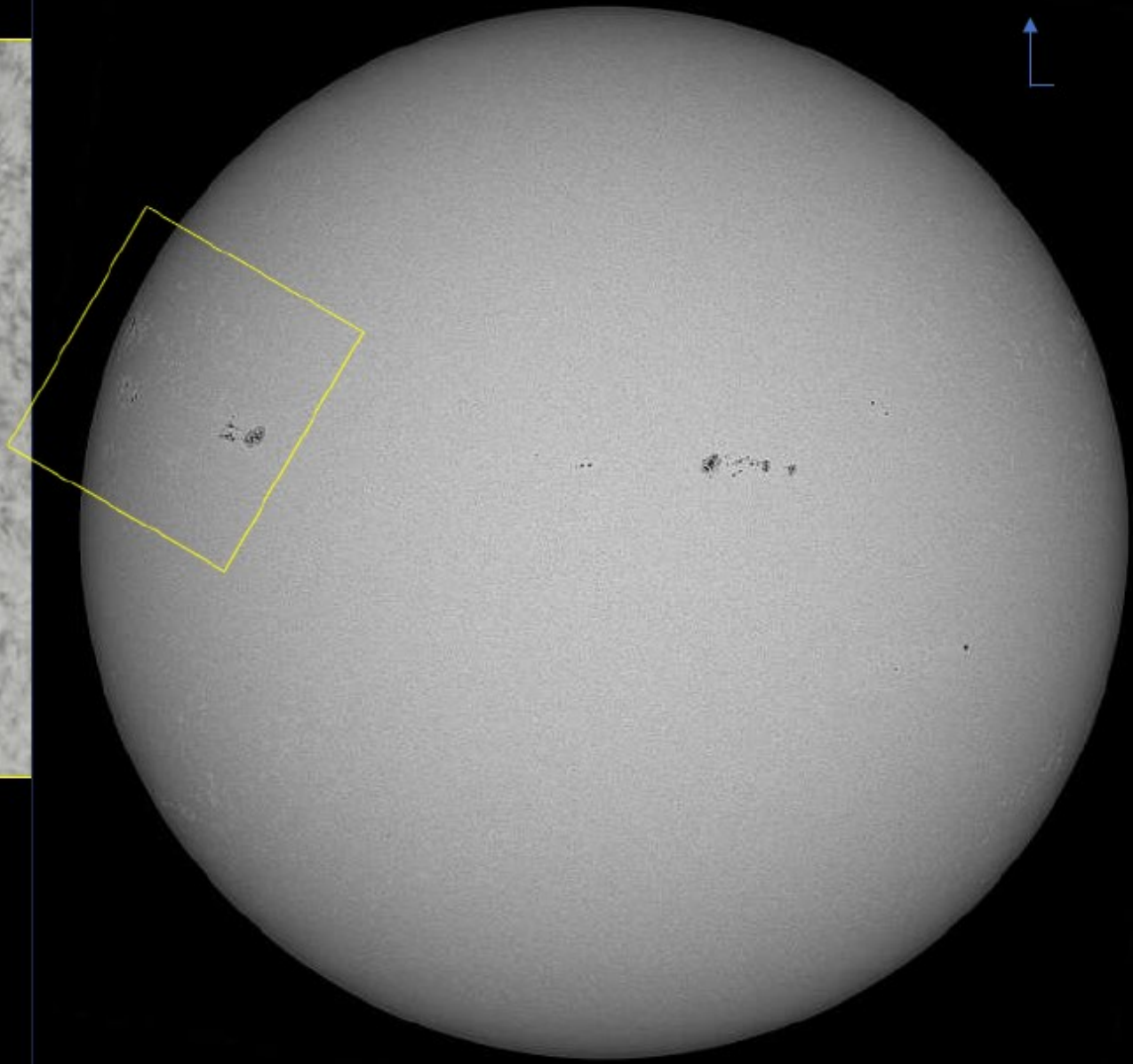
Hα Prom



Camera:
IMX 183MM (Zwo Asi)
2752x2754 px, 90s @ 30 FPS
AS!2 50% stack
AI Deconvolution & sharp

Sun 2023-09-06, 10 – 11 AM, 56N 12E Copenhagen Denmark, Transparency 5-6/7 Clear, Seeing 8/10 Calm, Temp.: 20° C, Humidity 60%
Zeiss 100/640 APQ refractor, **White Light:** Baader AstroSolar OD 5.0 (@ F/6.4), **H-Alpha:** Baader D-ERF front filter (85mm stop down) + DS Chromo Quark etalon (@ F/32)





White light: Camera IMX 183MM, ROI: 2752x2754px, Exp.: 60s @ 30 FPS
H-Alpha: Camera IMX 183MM, ROI: 2752x2754px, Exp.: 60s @ 30 FPS