



Founded in 1890

# The British Astronomical Association

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## BAA Solar Section Newsletter

### Sunspot data 2024 October

Day	g	R
1	7	166
2	8	160
3	7	147
4	8	135
5	7	120
6	6	120
7	7	119
8	5	104
9	5	104
10	5	97
11	5	97
12	5	100
13	5	100
14	5	96
15	4	89
16	5	92
17	6	107
18	7	96
19	7	105
20	7	104
21	8	134
22	7	88
23	6	84
24	6	92
25	8	123
26	10	174
27	10	174
28	9	170
29	8	146
30	8	170
31	9	163

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Images for the web should be sent to Peter Meadows: peter@petermeadows.com and copied to me. All digital images must be in "JPEG" format with the same orientation as naked eye orientation. Include initials, date and time in the file name. Keep each image file to less than 1Mb.

#### On-line Reporting:

<https://britastro.org/solarwl>

<https://britastro.org/solarha>

#### Observers:

- |                           |                            |
|---------------------------|----------------------------|
| C Bailey, Suffolk         | M Kinder, Cheshire         |
| R Battaiola, Milan, Italy | C Longthorn, Rugby         |
| M Boschat, Canada         | L Macdonald, Berkshire     |
| C F Bowron, South Yorks   | R Mackenzie, Kent          |
| A Bowyer, Epsom Downs     | M Mattos, Spain            |
| P Brierley, Cheshire      | P Meadows, Essex           |
| S Brown, Leicestershire   | A Mengus, France           |
| M Buck, Bristol           | H Meyerdierks, Germany     |
| L Cambon, France          | B Mitchell, Norwich        |
| G Clarke, Australia       | C C Moraes, Brazil         |
| E Colombo, Italy          | M Nicholls, Sheffield      |
| J Cook, Wolverhampton     | G Palmer, Wales            |
| A Coombs, Vic, Aust       | C Potter, Orkney           |
| P Curtin, USA             | R Samworth, Leicestershire |
| S Dawes, London           | J D Shanklin, Cambridge    |
| A Devey, Spain            | D Smith, Essex             |
| R Dryden, Oxon            | L Smith, Angus             |
| F Dubois, Belgium         | N Spencer, York            |
| T Emmett, Cambs           | M Stephanou, Greece        |
| M Giuntoli, Italy         | A Stone, Bristol           |
| D Glover, Essex           | T Tanti, Malta             |
| S Green, Lancs            | D Teske, Mississippi, USA  |
| K Hall, Warrington        | C B Thielke, Denmark       |
| B Halls, W Sussex         | P Tosi, France             |
| K Hay, Canada             | Towarzystwo Milosnikow     |
| A W Heath, Nottingham     | Towarzystwo Obs Slonca     |
| R Heard, Suffolk          | B Tynan, Renfrewshire      |
| R Hill, Arizona, USA      | S Ove Thimm, Denmark       |
| J Janssens, Belgium       | P Urbanski, Poland         |
| M Jenkins, Cambridge      | G Vargas, Bolivia          |
| S Jenner, Kent            | F Ventura, Malta           |
| A Johnston, Denbighshire  | D Vidican, Romania         |
| R Johnson, Surrey         | S Viney, Cheshire          |
| S L Karl, Aberdeen        |                            |

#### Monthly Means

MDFg:	7.61	(43 observers)
MDFNg	1.85	(35 observers)
MDFSg	5.93	(35 observers)
Mean R:	129.53	(42 observers)

### The Sun in White Light – October

There was a slight upturn in activity from the previous month due to an increase in southern hemisphere activity. Sunspot groups were numerous on every day of the month but in particular at the start of October and towards the end due to the return of several groups for a second rotation. Overall, activity returned to levels seen during 2024 May and June. Forty-three sunspot groups were assigned Boulder numbers, the largest/most active of which are reported on below.

**AR3839 S14°/190° & AR3844 S15°/198°** the former survived from the previous month type Hsx, whilst the latter was forming on the last day of September to the west of AR3839 and by the 1<sup>st</sup> of October was quite substantial type Dso. AR3839 remained type Hsx during its passage but closed in on AR3844 as it crossed the central meridian (CM), coming within the BAA 10-degree rule and thus counting as one single active area. AR3844 however, continued to develop substantially as it entered the SW quadrant. On the 3<sup>rd</sup> the region was described at a mean position of S13°/198° and of type Eac with an area of 840 millionths. On the 4<sup>th</sup> and 5<sup>th</sup> the group developed further to 1070 and 1120 millionths of solar hemisphere but remained as type Eac before declining to type Dac when near the SW limb on the 7<sup>th</sup>. Reported as visible with the protected naked eye (PNE) on the 4<sup>th</sup> and 5<sup>th</sup>.

**AR3842 S15°/178°** survived on the disk in the SE quadrant from the previous month and had strengthened on the 1<sup>st</sup> to type Ekc from type Eai. On the 2<sup>nd</sup> the group had a large leader comprising an elongated umbra with a forked light-bridge crossing at the western end and a bright arcing bridge at the eastern end. Following was an area of umbra, penumbra and many small sunspots with further small sunspots both preceding and to the south of the main sunspot. On the 3<sup>rd</sup> the main sunspot was described as complex containing several umbrae and by the following day, the group had grown to 1420 millionths in area, the group being type Eac. As the group crossed the SW quadrant, it reduced slightly in size to 1210 millionths on the 5<sup>th</sup> and 990 millionths on the 7<sup>th</sup>. By the 7<sup>th</sup>, the group was closing in on the SW limb and crossed the limb on the 9<sup>th</sup>.

**AR3843 S08°/212°** was the most westerly of the quartet travelling across the southern hemisphere. It was present at the close of September as a small collection of minor sunspots but developed into a Dai group on the 1<sup>st</sup> of October. By the 3<sup>rd</sup> the group was type Dac with an area of 380 millionths. The group maintained its composition until the leading sunspot reached the SW limb on the 6<sup>th</sup> and was thereafter lost to view.

**AR3848 N15°/115°** was first glimpsed on the NE limb on the 1<sup>st</sup> and had the appearance of a very large single sunspot. By the 3<sup>rd</sup> the group was fully onto the disk and was type Dkc, comprising of one large penumbral leader and two smaller sunspots following but in close proximity to the leader. The area of the group was estimated to be 920 millionths which had extended to 1120 millionths by the 5<sup>th</sup> when the group was more prominent away from the limb. The group classification was Cki due to comprising of one large irregular penumbral sunspot and several much smaller minor sunspots in close proximity. By the 7<sup>th</sup>, its general appearance had changed little but the main umbra had slightly enlarged. The group reached the CM on the 8<sup>th</sup> and was of type Dki through the appearance of small southerly sunspots and reduced area of 810 millionths. On the 10<sup>th</sup> the southerly extension to the main sunspot's penumbra was clearly seen curving to the west which had reduced somewhat by the 11<sup>th</sup>. Thereafter, a similar penumbral extension formed from the north. As the group approached the NW limb, the smaller accompanying sunspots faded from view and the main sunspot rounded the limb on the 14<sup>th</sup> type Hhx. Reported PNE on the 4<sup>th</sup> and 5<sup>th</sup>.

**AR3849 S06°/095° & AR3850 S03°/097°** another group travelling in close proximity that encountered the BAA 10-degree rule. Rotation around the SE limb on the 4<sup>th</sup> and was reported on the 5<sup>th</sup> amidst a network of faculae. By the 8<sup>th</sup> the group was type Eac with an area of 870 millionths comprising of a number of small penumbral sunspots and a few pores. The group was still type Eac on the 10<sup>th</sup> as it crossed into the SW quadrant. By the 14<sup>th</sup> the group had declined into a collection of 5 small penumbral sunspots approaching the limb and was lost to view the following day.

**AR3852 S12°/050° & AR3854 S05°/044°** was yet another combination travelling in close proximity. AR3852 rounded the limb on the 7<sup>th</sup> followed by AR3854 which developed on the 10<sup>th</sup> to its north-east. The latter sunspot group grew over the coming days with the leading sunspot gaining on the leader of AR3852 making an impressive combination by the time the groups reached the CM on the 13<sup>th</sup>. The group(s) had undergone some decay by the 16<sup>th</sup> when they were past the midway point of the SW quadrant. AR3852 had the appearance of an H class sunspot with a "Y" shaped light-bridge crossing its umbra. AR3854 had decayed also with the leading sunspot in the process of breaking up which it did the following day. Both groups were close to the limb on the 18<sup>th</sup> with the following sunspot of AR3854 almost seeming detached from the group. It rounded the limb on the 19<sup>th</sup>.

**AR3869 S17°/203° & AR3872 S15°/195° & 3873 S10°/176°** started to round the SE limb on the 23<sup>rd</sup> being the return of AR3844 and AR3842. By the 24<sup>th</sup>, the initial appearance of a Dso type group had given way to an extensive area of sunspot activity being classified as an Fac group at a mean

location of S15°/192°. AR3873 was a new development to the east of the returning sunspot groups which had a combined area on the 25<sup>th</sup> when all were in view, of 1270 millionths. By the 27<sup>th</sup> all 3 groups were strung out in a “smile” formation across the SE quadrant. The leading element of AR3869 was decaying by the 29<sup>th</sup> leaving the large penumbral sunspot withing AR3872 as the largest sunspot. The decay continued as the groups crossed into the SW quadrant and although still assessed as type Fac on the 31<sup>st</sup>, the combined area had reduced to 910 millionths.

**AR3876 S01°/205°** formed on the disk on the 25<sup>th</sup> to the north of the leading sunspot of AR3869. Although insignificant initially, the group developed rapidly overnight into a Dai group and thereafter added to the impressive composition of AR3869/3872/3873 as the leading group of the quartet. By the 27<sup>th</sup> the group was still type Dai but more extensive with a small penumbral leader and two penumbral followers with many smaller sunspots in-between. The group underwent significant development on the 29<sup>th</sup> sporting 3 penumbral sunspots in a line with the central sunspot being quite asymmetrical. The decay process set in on the following day with the follower and central sunspots much reduced. The month ended with the group nearing the limb with two small penumbral sunspots leading and a more decayed area of penumbra following.

**AR3878 N18°/138°** was seen just over the NE limb on the 27<sup>th</sup> as an Axx sunspot but this matured into an Eai type group the following day. By the 29<sup>th</sup> the group consisted of two main penumbral sunspots, the follower being the largest, with some minor sunspots in-between. The month ended with the follower enlarging being type Ekc with an area of 620 millionths.

**AR3879 N15°/112°** followed AR3878 onto the disk on the 29<sup>th</sup>, a large single penumbral sunspot on the NE limb. The following day the group was fully on the disk type Hhx. The group remained the same on the 31<sup>st</sup> with a total area of 730 millionths.

22 observers reported a Quality number of **25.61** for October.

## **The Sun in H-alpha**

### **Prominences**

16 observers reported a prominence MDF of **8.42** for October.

On the 2<sup>nd</sup> a bright pyramid type prominence was on the NW limb with a fainter hedgerow prominence to its south. The hedgerow persisted through to the following day. Part of the southern end of the hedgerow was seen on the 4<sup>th</sup> as an inclined pillar prominence.

An inclined pillar prominence graced the SE limb on the 14<sup>th</sup> and another strong inclined pillar prominence was on the NE limb. A further inclined pillar prominence was on the SW limb near to the approaching combination of AR3848/3850.

A smoking chimney type prominence was on the NW limb on the 16<sup>th</sup>.

A curtain type prominence appeared on the SW limb on the 20<sup>th</sup> and grew in strength and height over the coming days. By the 22<sup>nd</sup> it was around 50,000 km in height and stretched around the limb for 170,000 km. The prominence was reported present on the following day but shorter and then slowly declined. A shorter hedgerow prominence was also on the NW limb on the 22<sup>nd</sup> which proved to be shorter lived.

On the 23<sup>rd</sup> a double-arch prominence was reported on the W limb rising to about 50,000 km and with a width of 130,000 km.

A complex array of thin but bright prominences was seen above the S limb on the 24<sup>th</sup>.

Several small prominences were seen on the NW limb on the 27<sup>th</sup> the largest of which was a flame type prominence and an inclined pillar prominence was seen further south on the SW limb. This latter prominence developed into a small prominence hearth the following day but by the 29<sup>th</sup> was quite spectacular consisting of four large elements and a smaller prominence at the southern end. There was no sign of any of the elements on the 30<sup>th</sup>.

### **Filaments & Plage**

14 observers reported a filament MDF of **10.39** and 13 observers reported a plage MDF of **7.01** for October.

As AR3848 rounded the NE limb on the 2<sup>nd</sup>, the southern end of a large filament preceded the sunspot group. Plage was also visible to the south-east of the main sunspot. Two strong filaments were almost parallel to each other in the south-east quadrant whilst a long-broken filament sprawled across the SW quadrant to the south of AR3843 and AR3844.

AR3841 in the northern hemisphere had bright plage arcing along its northern extremity between the leading and following sunspots on the 3<sup>rd</sup>.

The southern-most of the two parallel filaments in the SE quadrant on the 2<sup>nd</sup>, grew over the next few days and was unusually wide on the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> as it entered the SW quadrant. The filament was estimated to be about 280,000 km long on the 7<sup>th</sup>. Also on the 7<sup>th</sup>, a filament to the south of AR3848

AR3848 was estimated to be 100,000 km in length and was the source of some minor flare activity. In the NW quadrant on the 11<sup>th</sup>, a long dark filament was reported measuring about 300,000 km in length.

A long filament trailed AR3848 on the 14<sup>th</sup> as the group started to rotate around the NW limb. On the 16<sup>th</sup> extensive plage linked the main sunspots of AR3852 and AR3854 with a small thin filament aligned north/south between the two groups. Some minor flaring was also seen.

A string of filaments was seen across the southern hemisphere on the 18<sup>th</sup> which were still present the following day.

Numerous filaments peppered the disk on the 22<sup>nd</sup> with a filament curving around the eastern end of AR3863 in the SE quadrant.

On the 23<sup>rd</sup> a long-broken filament crossed from the SE quadrant into the SW quadrant, measuring around 350,000 km in length.

AR3863 showed some minor flare activity on the 24<sup>th</sup> with small active filaments forming in a fountain-like spray from it.

New sunspot AR3878 rotated around the NE limb on the 27<sup>th</sup> amidst bright plage and minor flare activity. A small active filament was seen to form in association with a surge flare.

A broad tadpole-shaped filament was near the equator to the east of AR3873 and south of AR3878 on the 29<sup>th</sup> and an east-west aligned broken filament extended from near the SE limb to the south of AR3873. Both filaments were present on the 30<sup>th</sup> but had both undergone some shape changes and another very long east-west aligned filament was noticeable in the SW quadrant to the south of AR3869 and AR3876 further west.

### CaK

Two large areas of CaK emission were associated with sunspot groups located at S15°/090° and S12°/042°. Other minor emissions were seen around large sunspots such as AR3848 in the northern hemisphere but most activity was observed in the southern hemisphere.

CaK MDF **8.28** (14 days) observer: Brian Mitchell.

### Flares

Numerous minor and M class flares were reported to the Section during October. Two X class flare events were also reported. At 1225 UT on the 3<sup>rd</sup> Lee Macdonald observed a “huge, brilliant solar flare” within AR3842. He comments “probably the brightest and largest I have ever seen. It was dazzlingly bright – I could see it even with the filter tilted off-band.” Lee checked the event out in white light but unfortunately it could not be detected. Andy Devey also observed this X9.1 flare event at 1241 UT.

Andy also observed an X1.8 solar flare in association with AR3873 on the 26<sup>th</sup> at 0924 UT, the cool-down period was observed by Andrew Johnson at 10.10 UT when he estimated the flare as M2.

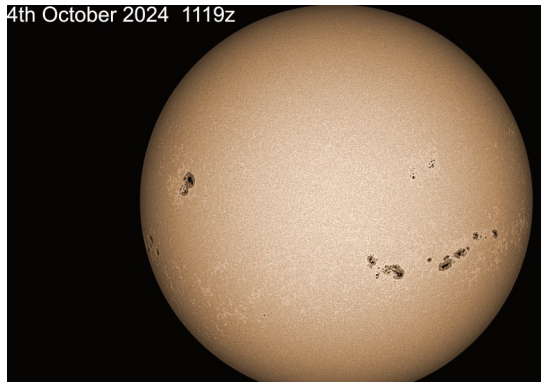
DATE	DURATION (UT)		ACTIVITY
4/5	21:15	01:00	Disturbed.
6	07:30	18:00	Disturbed.
6/7	21:45	18:30	Disturbed.
7/8	18:30	07:00	Active.
8/9	16:00	18:00	Disturbed.
10	07:00	15:00	Disturbed.
10/11	15:00	07:00	Intense
11	07:00	08:30	Active
11	08:30	18:00	Disturbed.
12	08:00	15:30	Disturbed.
12	20:15	22:30	Disturbed.
13	19:30	21:00	Disturbed.
14/15	18:00	03:00	Disturbed.
15/16	11:00	23:00	Disturbed.
17/18	20:00	04:00	Disturbed.
18/19/20	17:15	05:00	Disturbed.
26/27	17:00	01:00	Disturbed.
27/28	09:00	01:00	Disturbed.
28	04:45	09:30	Disturbed.
29	01:30	06:15	Disturbed.
29/30	19:00	16:30	Disturbed.
31/1	21:15	01:00	Disturbed.

### MAGNETOMETER REPORT

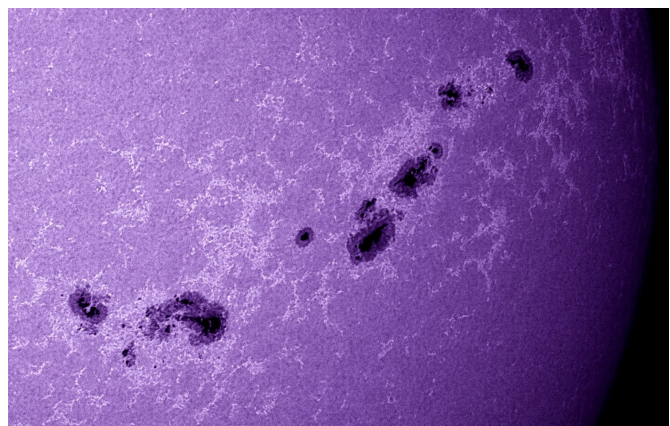
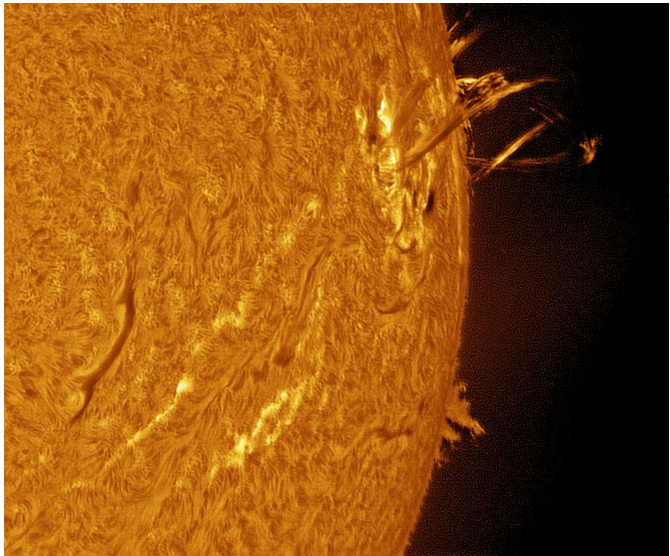
OCTOBER 2024

Solid-state magnetometer, Uncalibrated.  
John Cook

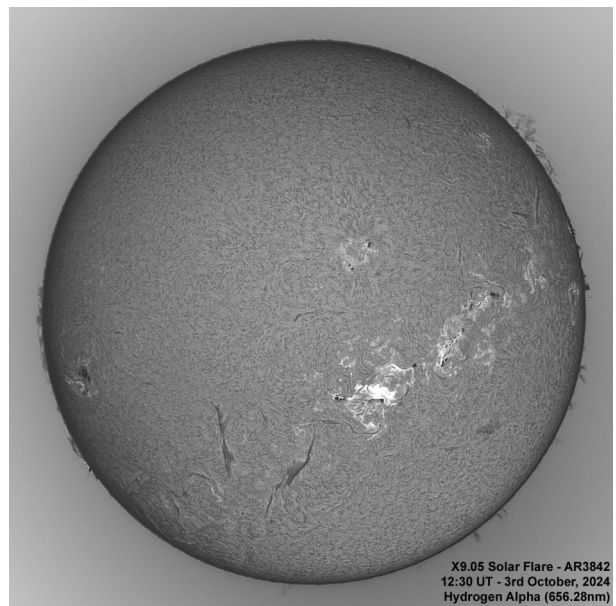
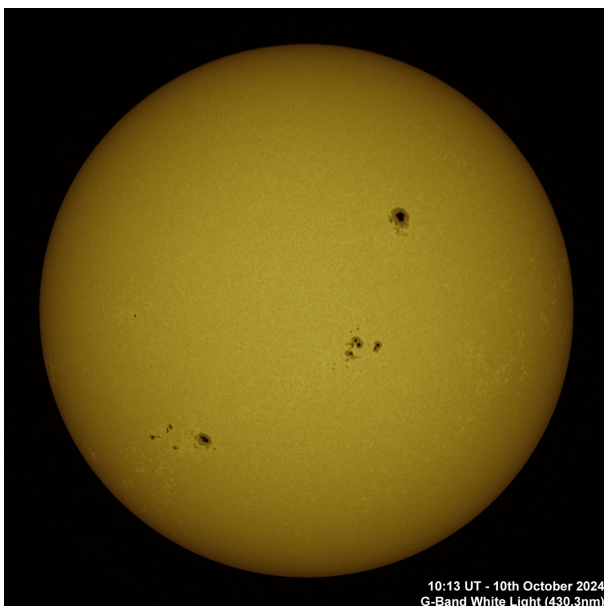




**Above:** AR3839/42/43/44 imaged by Chris Bailey 20241004 in white light  
**Above Right:** AR3842 approaching the SW limb and associated loops 20241008



**Above:** Image by Lee Macdonald showing the bright X class flare 20241003  
**Above Right:** The same combination in Calcium K-line imaged by Carl Bowron 20241004 at 1051UT  
**Below:** Two images by Brendan Tynan showing AR3849/50 (centre disk, west of the CM) prior to the X class flare. Images at 1013 UT on 20241010 and the corresponding H-alpha image showing the X9.1 flare imaged at 1230 UT the same day.



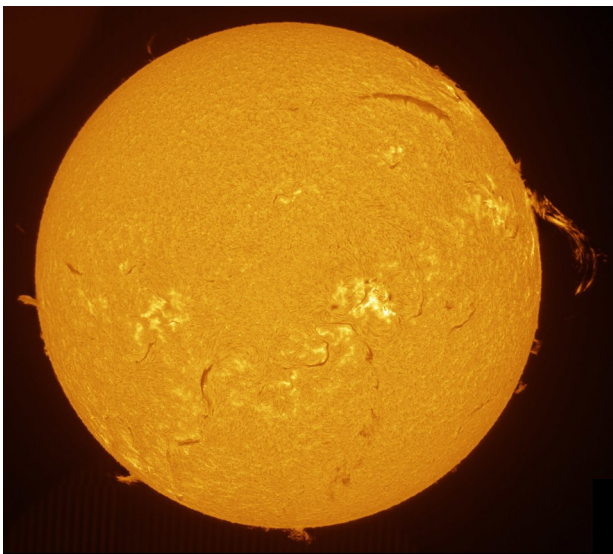
# Section News

Lately there have been several groups that have formed in close proximity on the disk or drifted closer together. With satellite technology we are able to determine the magnetic configuration of sunspot groups and thus SWPC assign Boulder numbers accordingly. Historically, the BAA has always applied the “10 degree rule” to sunspot groups and treated each sunspot within the parameter of that rule, as one active area. To keep our records relevant, the BAA continues with this practice regardless of the SWPC numbering process. The 10 degree rule is simply that if you measure 10 degrees or less from the centre of one active area to the centre of another active area in longitude (not more than 5 degrees in latitude apart), then the group is counted as one continuing area of activity. This sometimes works in reverse where a long and complex F class sunspot group loses its central components and the leader and follower sunspots drift more than 10 degrees in latitude. Again, these would count as separate sunspot groups for counting purposes and referred to as “a” and “b” of the original sunspot group number. If you have any questions, feel free to drop me an email.

As usual, please enter your observations by the 14th of December on-line and ensure your November images are with me before that date so I can publish the next newsletter and circulate it before Christmas.

A huge thank you to our imagers for sending in well over 300 solar images for October, only a few of which are featured here. There are many more on the Section webpages on the BAA site.

Our next Section Zoom meeting will be on Friday 13th December 2024 at 1930 GMT  
Meeting ID: 832 9722 3465 Passcode: 290095. Full details published in the previous newsletter.



**Left:** An eruptive prominence imaged by Stuart Green 20241014 at 0910 UT

**Below Left:** AR3868/71/72 imaged around the SE limb 20241024 at 0856 UT by Brian Halls

**Below:** Another spectacular prominence this time imaged by Brendan Tynan 20241029 at 1139 UT (inverted H-alpha image).

