

Dundee Astronomical Society Meeting Minutes 2018/2019 Season

25th January 2019 at the Mills Observatory

Committee Present

June Gilchrist	Chair
David Paterson	Secretary
Jim Barber	Director of Observations
Andy Heenan	Treasurer
Tony Hayes	Website Developer
Graham Young	Librarian
Ken Kennedy	
Phil Rourke	
Ed Fraser	
Graeme McAteer	

June Gilchrist opened the meeting at 1930 and introduced Alan Clitherow a member of DAS giving a talk on Solar Astrophotography. Alan has previously given talks on Planetary Imaging and Deep Sky Imaging.

Alan explained that now was a good time to start this aspect of astrophotography as the Sun was starting a new cycle observers can now view the increase in activity over the next 5 to 7 years approaching Solar maximum. Showing a professional image of the Sun today we could see the active region with two small sunspots and a filamentary structure.

The only safe way to view the Sun is indirectly with a camera and laptop or by eyepiece projection on to paper. If you make a mistake then equipment is damaged not eyesight. While full aperture eye-safe white light filters can be fitted at the front of the telescope these can be damaged with pin prick holes or may be dislodged. Alan explained while giving talks to schools and displaying the Sun through a telescope he would only use eyepiece projection for the above reasons. Again, while a dedicated H alpha telescope is eye-safe and is designed for visual work it must be assembled correctly to guarantee safety.

Mylar films can be obtained to make your own full aperture filter but the correct eye-safe neutral density must be selected, some such as ND3.8 are camera safe not eye-safe. Beware!

Having fitted a white light filter and fitted a camera high frame rate video files can be collected for later analysis using specialist free software. Night time narrow band eyepiece filters can be fitted to enhance detail such as H alpha and O III. These provide more contrast and pass a very narrow band of wavelengths.

Dundee Astronomical Society Meeting Minutes 2018/2019 Season

25th January 2019 at the Mills Observatory

Alan explained the photosphere can be overwhelming the emissions that can otherwise be seen in the chromosphere, so the use of narrow band filters gets around this issue.

What can be seen on the Solar surface, well more than just black sunspots. Details of the umbra and penumbra of the spots, filaments, prominences plage, faculae and granulation.

The granulation is the collection of convective cells continually in motion across the Solar surface. The prominences are seen on the limb of the Sun (plasma trapped above the surface, while the filaments appear dark above the surface of the sun but are the same phenomena. Flares seen as sudden brightening in active regions can occasionally be imaged by amateurs but they are transient so luck is required to capture these.

Flares are associated with aurora and coronal mass ejections (CME) and when directed towards earth can be hazardous to communications and electricity supply networks.

Alan showed pictures of the kind of telescopes and accessories he employs when observing the Sun. The 80mm refractor used for eyepiece projection is carefully guided at the Solar rate to prevent damage to the eyepiece. Alan recommends using your cheapest eyepieces when trying out this kind of observing!

Alan also employs a 4-inch f11 telescope with a planetary camera and energy blocking filter the Herschel Wedge which must be matched correctly to your telescope type. An H alpha Etalon is fitted at the front of the telescope which can fine tune the frequency passed to the constant bandwidth energy blocking filter. The Etalon comprises optical plates one of which can be fine tuned to a particular H alpha frequency. The principal is based on constructive and destructive interference and a comb shaped spectrum is passed and the blocking filter allows one spike through.

The 50 mm Etalon costs £1200 but could be fitted to different telescopes of suitable aperture and focal length so is quite flexible compared to buying a dedicated solar telescope such as the Lunt 50 mm at £1200 or the Coronado PST 40 mm at £1000.

Daystar Quarks produce a Magnesium line filter with built in 4 x Barlow which is good for small detail but employs electronic tuning which takes 5 to 10 minutes.

Baader produce high quality narrow band filters available individually or as sets such as the Calcium, Solar continuum, OIII, H alpha and these can be used at night or for Solar.

Typically, when carrying out video capture the technique is lucky imaging where a proportion of the exposures will be good so best to collect at least 500 to 2000 frames.

Autostakkert can be used to stack the best 25% and this is fully automatic software once the reference image has been set up correctly. This software applies a grid of reference points to the Solar surface and then automatically stacks removing noise. This can be processed further in Registax where the wavelet controls can be adjusted to enhance/sharpen the image according to taste.

Dundee Astronomical Society Meeting Minutes 2018/2019 Season

25th January 2019 at the Mills Observatory

Alan pointed out that it is best to use a monochrome camera as this produces the best detail with narrow band filters, after all false colour can be added later according to taste using photoshop for example. Alan also commented on DSLRs since they are colour cameras, they have the same Bayer matrix as a colour planetary camera and while they can be used are not as good as a monochrome camera. The monomode on the DSLR still uses the Bayer matrix.

Alan demonstrate the use of Autostakkert, Registax and Photoshop CS2 to process the video files.

Autostakkert choose the centre point, use top 25% of registered images. When setting up grid alignment points remove points which are not on the surface.

Registax use the wavelets to sharpen the image, some experimenting is required.

Further processing is required in photo shop to enhance the prominences which are under exposed. The levels and curves feature can enhance the prominences but over expose the Solar surface so two layers are created where one layer has correctly exposed Solar surface and the other layer has the correctly exposed prominences minus the solar surface these can then be combined to give a very detailed pleasing image of the Sun.

Following a question and answer session Alan was warmly thanked by the chair and the membership for a very expert talk packed with practical information.

Following a tea break Jim Barber presented his February sky notes with some assistance from Ken Kennedy who explained what to look out for in February with regard to the Moon. Jim will be providing a February challenge for members to look out for on the DAS website.

The meeting was closed at 2140.