

Some like it hot... DMK cameras reach the boiling sun

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A slidely modified H-alpha Telescope

A skywatcher ED100 telescope with 100mm aperture/ 900mm focal length was modified for H-alpha observations. The original ED100 was shown to be highly corrected for the red light as published by Mr. Rohr, Germany.

The telescope was used in combination with a Solar Spectrum Filter SO-1 (19mm) 0.2 Å bandwidth (Baader Planetarium, Germany). The very narrow banded SO-1 filter delivers detailed views with high contrast. It requires parallel oriented light rays respectively no flexure in the optical path for its optimal performance. In order to prevent any flexures, the original focuser was replaced by a very stiff FeatherTouch Digital Focuser (Starlight Instruments, US). The whole setup is mounted on a Alt-AD7 mount (Eckhard Alt, Germany).



The front of the telescope was equipped with a special energy rejection filter, the C-ERF (cool-energy-rejection-filter) (Baader Planetarium, Germany). Its main purpose is to reject the infrared rays of the sun, which normally heats up the optical system. Additionally it is combined with a stepless adjustable aperture, to adapt the optic to the various telecentric systems (TZ-2, TZ-4), which generate the parallel light rays. The two shown pictures had been taken at a full aperture (100mm) and at a final focal length of 3600mm (TZ-4 equipped).

Why DMK21 and DMK41 Firewire cameras?

The amount of light passing the 0.2 Å SO-1 filter is very...very low and forces the observer to select proper cameras for the imaging of the H-alpha sun through the ED100 telescope. The aim is to obtain as many as possible sharp images in a relative short time !

The DMK21 delivers under these conditions about 15 frames/sec at gain 650, suitable to film avi sequences of faster moving details (i.e spicules as shown in figure 1.) on the sun and at times of bad seeing conditions respectively.



Figure 1. sun 29.06.2008 DMK21 gain 650 1/120sec 100/450 selected/ 30sec avi (15 frames/sec)

The DMK41 generated about 10 frames/sec at higher gain 850. This is mainly caused by the 4 times bigger chip (data format) as well by the smaller and slidely less sensitive pixels compared to the DMK21. The advantage is definitely a higher resolution. I personally prefer the DMK41 at times of better seeing and also to capture wider surfaces as shown in figure 2. or big protuberances of the sun.



Figure 2. sun 24.08.2008 - DMK41 gain 850 1/30sec 320/520 selected/ 50sec avi (10 frames/sec)

In order to keep the frame rate as high as possible, the firewire connection provides the necessary fast data transfer to the internal harddisk, which is directly linked to the main board of the personal computer.

At the end, each operator will have to find himself a compromise between the number of captured and stacked frames and the maximum time before the details on the sun start obviously to change (< 60sec). The gain should not exceed 850 and the stacking in Registax 4.0 may include a couple of hundred of stacked frames to keep the grain low. The frames may be aligned at up to 10 points distributed all over the picture and the final processing in PS may be mandatory for applying a real unsharp mask.

Enjoy the potential of the DMK cameras...and of course the beauty of the sun!

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