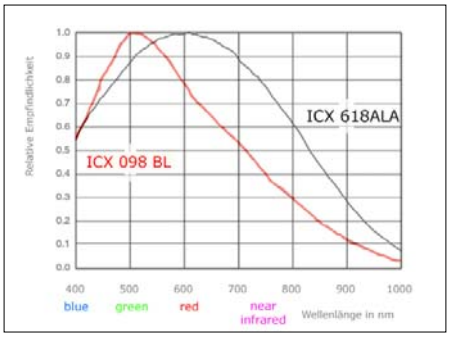
My first results testing the new DMK AU618AS from The Imaging Source (TIS)

In the early summer of 2011 the new model DMK AU 618 AS was available on the german market and I get one exemplar from Baader Planetarium GmbH for testing the new camera.

TIS itself is advertising the camera among other thinks with *"the model DMKAU618 AS is equipped with the SONY sensor CCD ICX 618 ALA, which is extremely sensitive in the near infrared spectral range".*



A comparison between the spectral curves of relative sensibility between the SONY ICX 098 BL (DMK AU21 AS) and the SONY ICX618ALA (DMK AU618AS) shows clearly, the maximum sensitivity is shifted from the green spectral range (500nm) to the red at 600 until 700 nm. At the near infrared range at 800nm the ICX 618 ALA is as twice more sensitiv than the ICX 098 BL.

But this is a comparison between the relative sensibilities. How does it look with a comparison in absolute sensitivities? To answer this question, I have taken solar images in three spectral ranges which are shown below.

Unfortunately at this time my DMK AU21 AS was defect, so I was forced to take a DMK AU 31 AS. I know, that this is not absolutely correct with reference to the smaller Pixel size of the ICX 204 AL Chip in the DMK 31 but a trend is clearly visible.

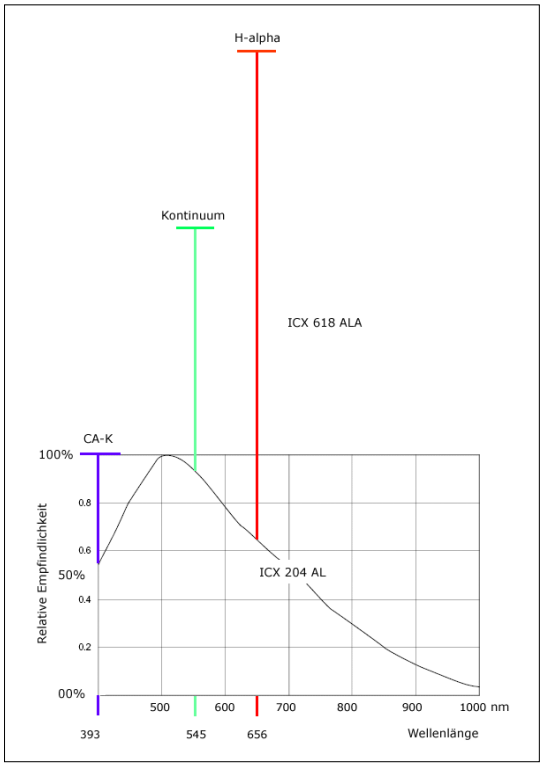
Following a short description of my instruments and the used filters for the different spectral ranges used for this test:

Blue: TeleVue Genesis refractor 100/500mm combined wit a Lunt CA-K II filter with 2.2 Angstroem full widh at half maximum at 393 nm.

Green: Astro Physics EDF refractor 155/1085mm, combined with a Baader Solar Continuum filter, approx. 30nm full widh at half maximum at 540 nm and

Red: homemade folded refractor with 150/2250mm, stopped down to 80mm, combined with a DayStar H-alpha filter with 0.5 Angstroem full widh at half maximum at 656 nm (see image above)

The results in measuring the sensitivity between the two cameras was just comparing the exposure times. Gain setting and the adjustment of contrast was at all taken avifiles absolutely identical.



The results:

The DMK 618 is in the blue spectral range about 50% more sensitive than the DMK 31, in the green spectral range more than 100%- and in the red spectral range about 200% more sensitive than the DMK 31.

Put these results in a graphic as shown here left, means

blue: reducing the exposure time for a single raw frame from 1/2500 to 1/3333 second,

green: reducing the expore time for a single raw frame from 1/1000 to 1/2000 second and

red (dimm prominences): from 1/15 to 1/60 second and surface details from 1/45 to 1/180 second for a single raw frame

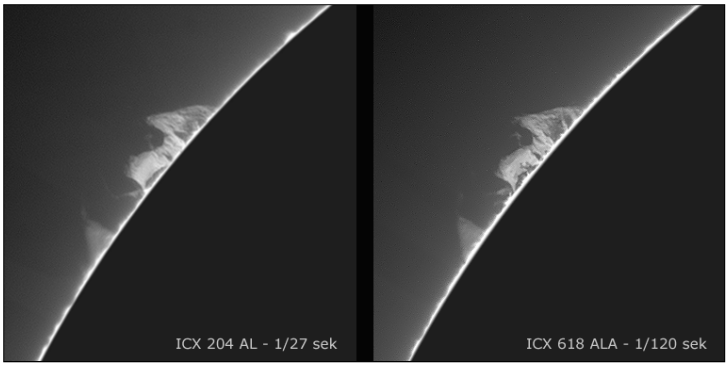
In the blue and in the green spectral range it is not so important to reduce exposure times, because they are also with the DMK 31 short enough to “freeze” seeing. But the enourmes sensitivity of the DMK 618 in the red and in the near infrared spectral range is very important, because seeing conditions in daytime are often realy absolutely bad.

Also important is to point out, that reducing exposure times below 1/60 second allow the observer to take the advantage to use the maximum transfer rate of 60 fr/s. This is important first that the observer gets the maximum of raw frames in a short interval of good seeing and second that the observer is able to document fast changes in i.e solar flares or eruptive prominences in time intervals as short as possible.

Also important for observer who takes RGB movies of as example Jupiter to get sharp images for a rotation sequence without in-motion unsharpness based on the high rotation speed of the planet.

I know, that there is a discussion in several astronomical boards about the appearance of articifial artefacts at high download rates of the raw frames. Stating for me (and several friend, who are also working in webcam astronomy) I have had never problems with this. May be the reason may be, that I seldom use Gain setting higher than 400 (except at dimm prominences) and I don´t sharpen the stacked final image too much.

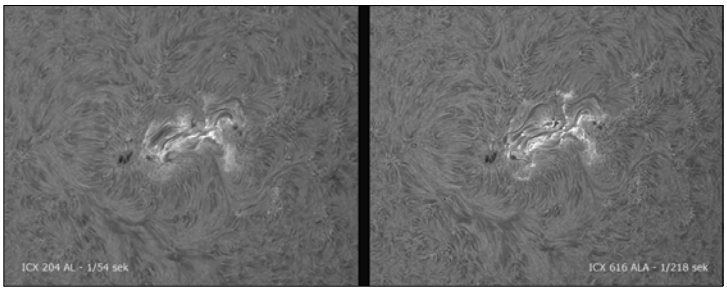
Image examples:

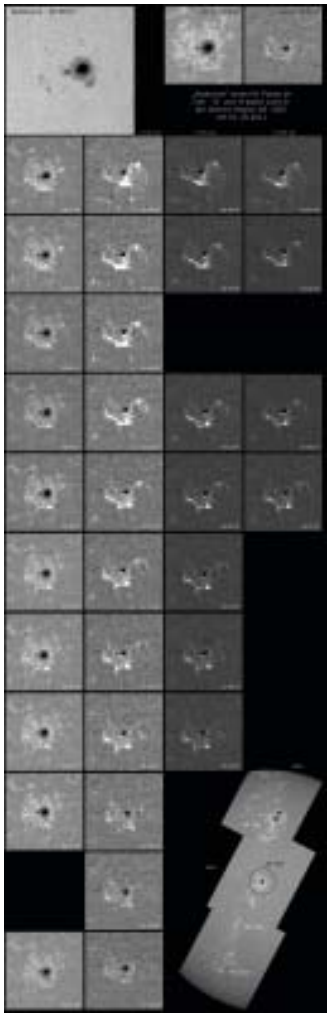


Inactive prominence

About reducing the exposure time from 1/27 (left) to 1/120 second (right) the final image taken with the DMK 618 looks more clearly and sharper (28.july 2011)

Active region 1260 show the same effect by reducing exposure time from 1/54 (DMK 31) to 1/218 second (DMK 618).



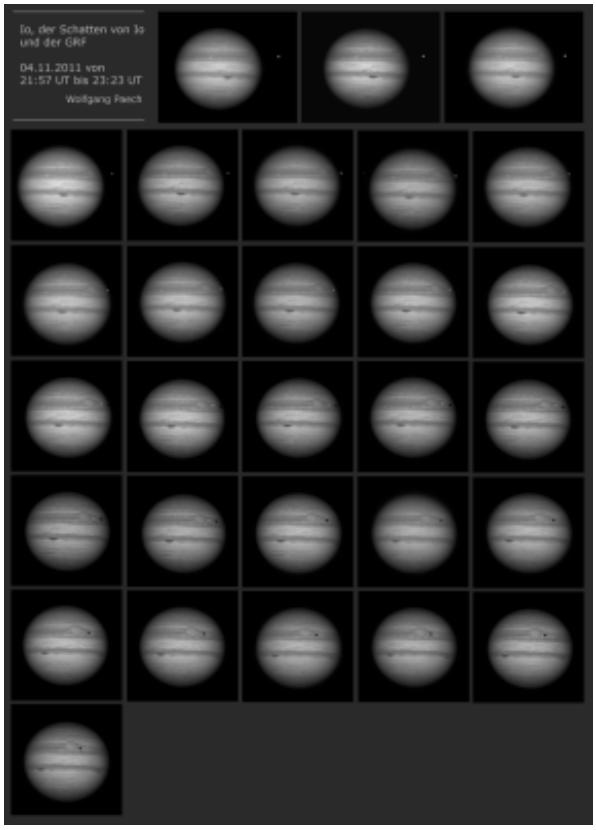


The left sequenz shows the “anatomy” of a class M1 flare at the first of october 2011 (active region 1305). The outermost left column shows the flare in the light of cak-II. Avifiles was taken with the DMK 31.

The three other columns show the flare in the H-alpha light with different exposure times. All avifiles taken with the DMK 618.

Each avi file contain 1500 raw frames from these was stacked 13% (195 raw images)

Caution: the download file in original size is about 2.8 Mb.



And one last example for a very fast image sequence (see left). It shows the rotation of Jupiter and a transit of Io and its shadow in a time intervall of just 90 minutes.

This are 29 avifiles, each avi contains 3.000 Raw frames. 240 Rawimages was stacked for the final image. Instrument was my 155mm Astro Physics refractor, equipped with a Baader Fluorid Flat Fiel Conververter FFC). The focal length was about 4.200mm. Each single rawframe was exposed 1/91 second. A UV/IR blocking filter was used.

My Conclusion: The new DMK AU 618 AS is a very sensitive camera with low noise, when using with short exposure times.

I have also taken some (single) images with long exposure times between 15- and 132 seconds. The results are very noisy and compared with the DMK AU 21/31 AS much poorer.

It is a great camera for taking H-alpha images, fast solar- and planet image sequences and also for L-RGB planet imaging, when the raw frames of the L- channal are taken in the near infrared spectral range through an ir-passfilter.

- The only drop of bitterness is the small size of the CCD sensor built in the DMK AU618 AS, which needs to take mosaic images for larger solar structures in H-alpha or moon features at longer focal length.

28.11.2011 by Dipl.-Ing. Wolfgang Paech