




CELESTRON

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RASA 11"


YOUR PERSONAL IMAGE TRAIN . R11G2

 **CELESTRON**

ROWE-ACKERMANN
F/2.2 SCHMIDT ASTROGRAPH

RASA 11 F/2.2

IMAGE TRAIN



IC5146
Subframe: RASA 11
20x180s / ISO400
Nikon D810A
Chip Size: 36x24mm

HANDLING AND TIPPS

RASA 11" BY CHRISTOPH KALTSEIS

**FOR YOUR PERFECT
IMAGE**



NGC 6888
RASA 11 @ F/2.2
20x180s / ISO400
Nikon D810A
Chip Size: 30x24mm

NIKON D810A AND FLI 16200 AT THE RASA 11"

**TESTED WITH 36,3 MEGAPIXEL @ 4,8MY
AND 16 MEGAPIXEL @ 6MY**

HARDWARE: FOR YOUR IMAGES

- ▶ Celestron RASA 11" *
- ▶ Baader UFC for RASA 11"
- ▶ FLI ML 16200
- ▶ Baader LRGB & HA / S2 / O3 for f/2 systems (50,4mm)
- ▶ Mount: 10 Micron GM 2000 HPS *
- ▶ SBIG ST-i Guider Set for Dithering Nr.:# 190 5755 S *
- ▶ Additionally: *
Cotton gloves, dew shield + heating, Flat film, Baader Sky Surfer 3 or 5 red dot finder

* Recommended, if you're only using a DSLR



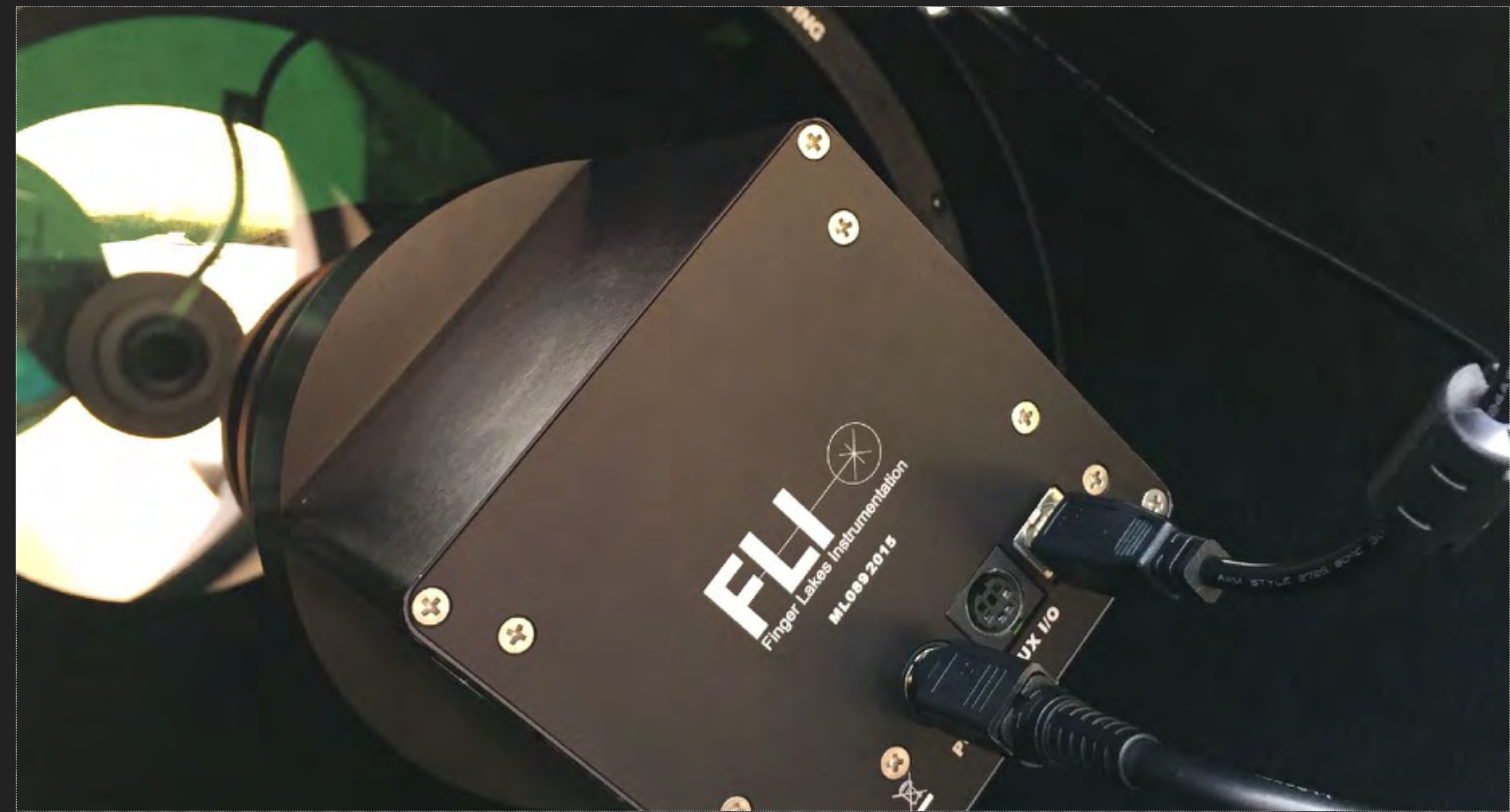
STICK TO THE RECOMMENDED WORKING DISTANCES!

- ▶ 1.) For DSLR / CCD use the included M48 adapter to the RASA 11" (Backfokus 55mm! measured from the adapter)
- ▶ 2.) CCD images with Baader UFC for LRGB and in addition Ha, S2, O3 for f/2 systems!
- ▶ 3.) IMPORTANT: Remove the original RASA-filter from the corrector with a size 2 allen wrench. This way, you can remove the filter without scratching it.
- ▶ In very wet nights, „dew shadows“ may appear on the RASA (see image). They did not harm the image! Using the fan made them disappear on the next day (let the fan run when it is warmer!)



* dew shadow

TAKE CARE OF THIS WHEN USING A CCD WITH THE RASA



Unscrew the original RASA FILTER with a stick of the matching length,
only this way the Baader UFC will have the correct backfocus!

Baader UFC + FLI ML 16200 at RASA 11"

WHICH FILTERS ARE BETTER?

The peak intensity wavelength of an interference filter moves to the shortwave (blue) part of the spectrum when you use faster optical systems. In extreme cases, the transmission curve may not „hit“ the emission line any longer, so you will lose the light of the nebula.

E.g., a standard H-Alpha-filter is manufactured for a peak intensity wavelength of 656.3 Nanometer. This design is working best for optics with a focal ratio between $f/10$ and $f/3.5$.

But this is only true for filters with a half width (FWHM) of 7nm. If you are using a narrower filter (with 3 or 3,5nm half width), the shift of the peak intensity will heavily dim the H-Alpha-light, because it already hits the slope of the transmission curve!

This is why our 3.5 nm H-Alpha filter has got a transmission window which fits very good onto the H-Alpha-line with optics between $f/5.5$ and $f/3.5$. This is made possible by steep slopes and a broad transmission peak.

With such a transmission plateau, even our standard filters with 7nm FWHM give you a transmission of ca. 90% at telescopes between $f/10$ and close to $f/3.5$.

But they won't work at $f/2$; the peak intensity wavelength has moved too far. The filter has to be constructed for a peak intensity wavelength of ca. 660nm, because you have a shift of about 4nm.

Some standard filters let „some“ light pass even if used at $f/2$, but the transmission will be only 30 or 40% and not 90%. It is amazing that many users do not realize this and instead compensate it with longer exposure times or think that the low contrast is caused by other effects.

standard filter



11" RASA F/2.2 & FLI ML 16200 | Baader H-Alpha 7nm | 10x60s | ©

f/2 filter



11" RASA F/2.2 & FLI ML 16200 | Baader F/2 H-Alpha 10nm | 10x60s | ©

each 10x180s with FLI ML16200 + Baader UFC

BAADER UFC . F/2 FILTER H-ALPHA, S2, 03

- ▶ Differences between F/2 Highspeed filters and standard filters are obvious.
- ▶ The signal strength at same exposure times is different. People often think that there is not much H-Alpha and simply compensate it with longer exposure times.
- ▶ The image of M42 with the FLI ML16200 + Baader UFC reached after 180s more than 65535 counts in the center, compared to only 42000-44000 with a standard H-Alpha-filter.
- ▶ In the whole image, f/2-filters show more details in H-Alpha - the images were acquired in one night under the same conditions. Separate flats were used for each filter type!
- ▶ Image processing and stacking was identically for both!

CAREFUL AND GENTLE

- ▶ Test the long thread of the adapter without camera. Use cotton gloves to avoid finger prints.
- ▶ Screw the adapter tightly and rotate the camera into the desired position, before you finally lock it. Shaking the setup softly removes warpings.
- ▶ Finally tighten the lock screw - but without force - don't „over-do“ it. Now the RASA is connected tightly with the camera. In case of large temperature differences in the course of a night, you should check the lock screw. It usually loosens a little bit, so you have to tighten it again.



Avoid straight cables in front of the optics!



< straight

cable guiding

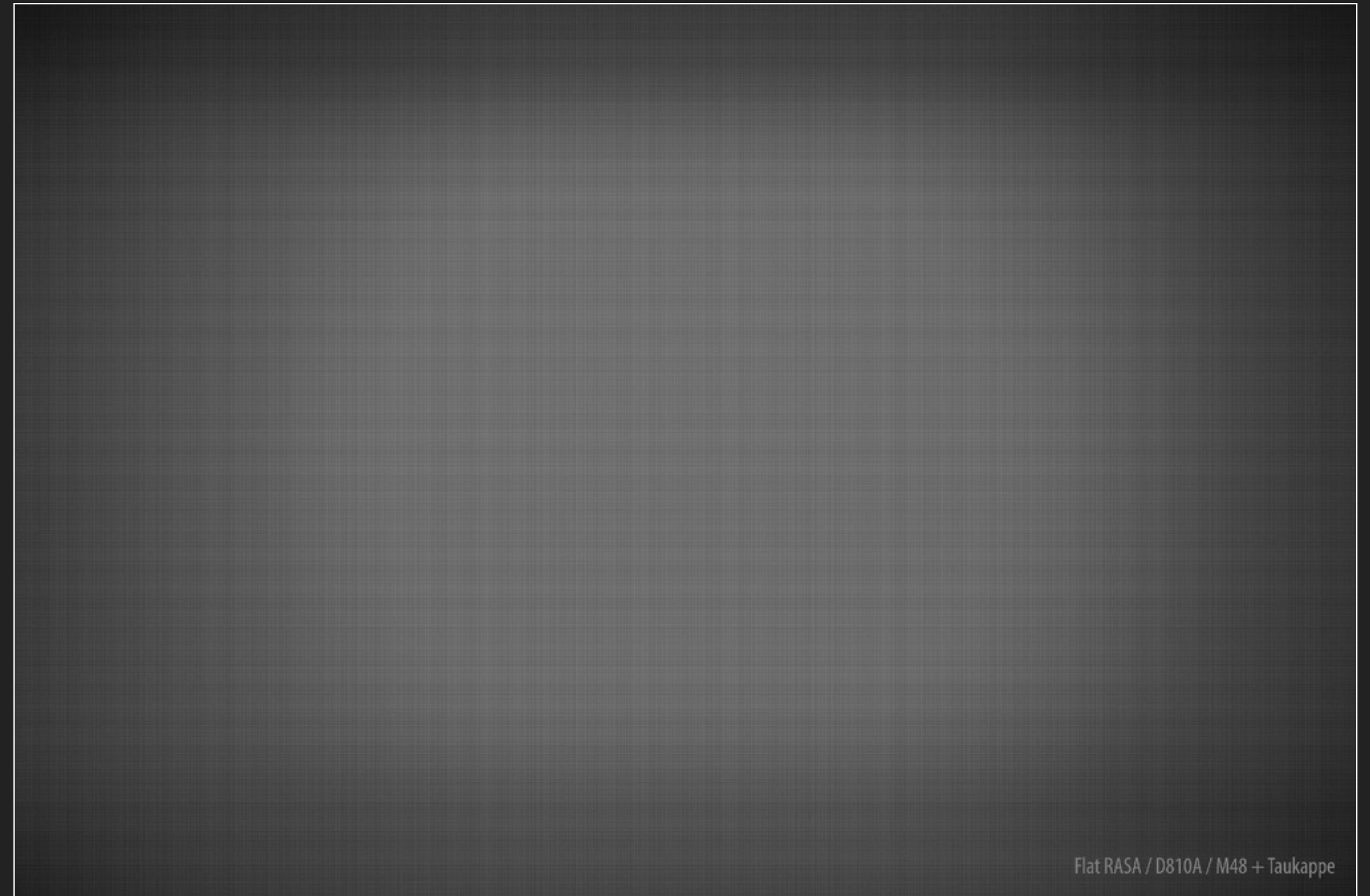
spiral >

M45
RASA 11

Nikon D810A
Chip Size: 36x24mm

RASA 11" + NIKON D810A

- ▶ SKYFLAT:
D810A + M48 original adapter
Full frame chip!
- ▶ Nikon D810A full frame DSLR can be used with sky flats (as every other DSLR) - but flats which were taken when the ambient temperature was too high are unfavorable for data reduction! (Noise, Amp-Glow)
- ▶ Never underestimate the colour of the sky in sky flats and the result in RGB after subtracting the flats. RGB is not 1:1:1!!!
- ▶ Better use a flat screen when using a CCD and HA, S2, O3 - then you won't have trouble when changing the filters. You can take flats also at cooler temperatures with a DSLR!

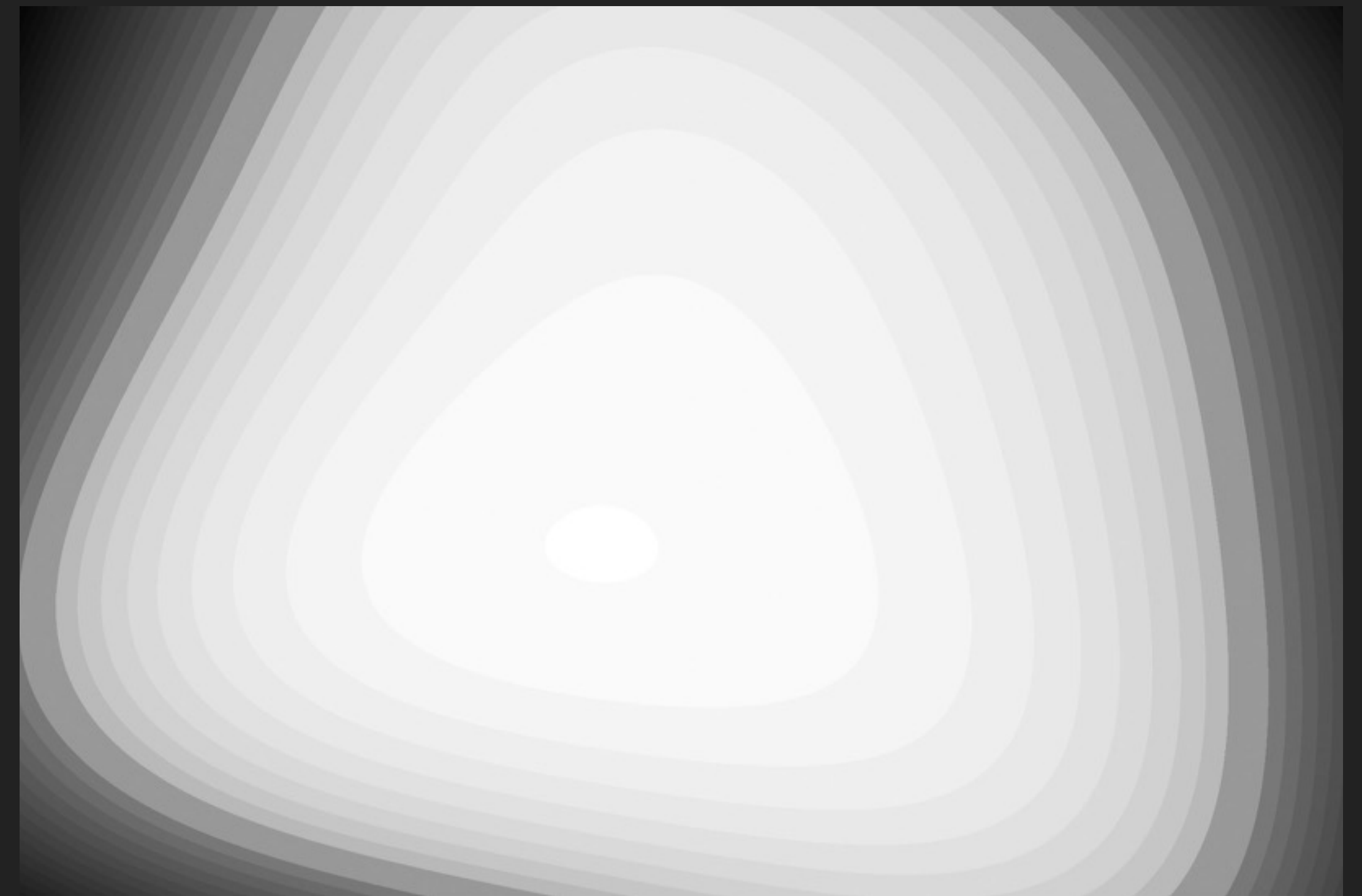


Flat RASA / D810A / M48 + Taukappe

DO NOT USE „FLEX“ – DEW-SHIELDS!

- ▶ Golden RULE: Always use hard dew shields
- ▶ Soft (Flex) dew shields can change their shape during the night, and a flat can't compensate the changing illumination. (see image)
- ▶ The image shows the effect at a C14 EHD with M68 adapter and a full frame sensor. The deformation is the problem, because of this the flats no longer work!

„Deformation“



20x Lum | Median | STF | C14 EHD F/7.605

CCD ADAPTATION TO THE RASA WITH BAADER UFC (=UNIVERSAL FILTER CHANGER)

Baader - UFC

- ▶ There are adapters with different lengths for various CCD cameras - you need the perfect distance from the sensor to achieve a perfect image quality.
- ▶ You can use L-RGB, H-Alpha, S2, O3 Filters with up to 50x50mm (without housing)
- ▶ Easy to use and operate
- ▶ Baader Website:
[UFC Produkt Information](#)



RASA with FLI ML16200 + UFC + filter holder

READY TO GO!

- ▶ Did you check everything?
- ▶ Is the weight-balance of the GM 2000 HPS adjusted perfectly?
- ▶ RASA 11" Mirror Locks / Up is up and down is down
- ▶ Place the cable in a spiral/curve for a fine image!
- ▶ PC - Driver & Software - is everything ready?
- ▶ Switch on the power supply!
- ▶ Switch on mount + CCD!
- ▶ Do the alignment of the GM2000 HPS
- ▶ Connect the Autoguider cable with the GM2000 HPS (necessary to dither the images)



FOCUSING AT F/2.2

**PERFECT SHARPNESS FOR FAINT
DETAILS ALL OVER THE IMAGE**

Exposure time 36min during half moon with RASA 1.1 and Nikon D810A



RASA 11 11 "

1ST LIGHT

NGC225 / vdB4 / 45min / RASA 11 - Nikon D810A

FOCUSING WITH DSLR AND CCD

- ▶ Seeing is always crucial - the RASA has got a very good resolution, so bad seeing will not go unnoticed. A focal length of 660mm may not be much - but the resolution is excellent! (11" are 11" aperture!)
- ▶ Control your DSLR via the PC and use Live View + Bahtinov Mask for focusing. The Bahtinov Mask can be put onto the dew shields - this works fine!
- ▶ Or use a software for focusing, with FWHM and brightness values!
- ▶ Use Maxim DL with FWHM and brightness values. Tip: Do a „focus pass“ with DSLR or CCD and the RASA!
- ▶ Take a test image and check the quality all over the image - even with 30s exposure time you will get a good impression!
- ▶ Check the temperature and re-focus, if necessary!

MIRROR LOCKS

THE MIRROR STAYS FIX...

DON'T FORGET / LAST CHECKS OF SYSTEM + IMAGE

- ▶ Let the fan run for ca. 45min-60min, so that everything is at the same temperature!
 - ▶ Wait 15-30s after focusing, so that the mirror can come „to rest“ - then tighten the mirror locks.
 - ▶ Lock the first screw for 50-60%, then the second screw for 50-60%. Now lock the first screw for about 90-95% and the second screw also for about 90-95%.
 - ▶ I never tighten both screws completely - 90-95% are sufficient.
 - ▶ CAUTION! Loose the screws before re-focusing, otherwise you may damage the mechanics!
- ▶ 36x24mm Chip: 4,8my (tested)
Nikon D810A
 - ▶ 27x21mm Chip: 6my (tested)
FLI ML 16200

CHECK DATA, IMAGE & FOCUS IN CONSTANT TIME STEPS

- ▶ Temperature drift - focus a little bit in front of the perfect focus - so the optics will drift into focus when cooling down
- ▶ Turn off the fan when there is a higher humidity close to the ground (not even fog!) This humidity can get into the telescope and cause shadows or fogging of the mirror.
- ▶ Feather Touch focuser and position of the mirror - turn at least 1,5-2 rotations clockwise! After this, set the telescope to the perfect focus and tighten the mirror locks.
- ▶ Always use dew shield + heater. The FLI ML16200 has got an active cooling, so you probably will not need the heating, but use it just in case.
- ▶ Practice changing the filters with the FLI ML16200 again and again - many things aren't that easy during the night as they are in full daylight - and always take care of the filters! (Dust or finger prints can cause problems with the flats!)
- ▶ Don't let the filters get too cold - keep them protected - otherwise water may condense on them while you change them because of the CCD's heat inside of the dew shield!
- ▶ Do NOT remove the dew shield - you might change the position of the cables. Then the flat and reflections of bright stars will change, too. This may cause problems when centering on the stars and combining the images!

IT SIMPLY WORKS, AND WORKS, AND WORKS

- ▶ Unguided & offers all functions without a PC!
- ▶ 60kg payload (extreme: C14 f/11 @ 3910mm)
- ▶ Computer-controlbox with Linux Management System to control all features of the mount like satellite tracking, moon feature and many other options...
- ▶ Ports: RS232, Ethernet, Wi-Fi
- ▶ 4 lines stand-alone hand-control with metal housing and heated display
- ▶ Save Point Models for your telescopes
- ▶ 11 Stars - unguided
- ▶ For PC-control: Virtual Keypad, Clock Sync Tool, Multi Mount with ASCOM drives
- ▶ You can see and feel quality and precision



DON'T GUIDE ME ! „QUICK START“

- ▶ Start, unpark Mount, switch off Dual Axis Tracking!
- ▶ Set time, date, coordinates and height
- ▶ Clear Alignment
- ▶ 3-Star Alignment - place stars the exactly in the center!
- ▶ Polar Alignment - adjust AZ and polar axis - not with the Keypad!
- ▶ Clear Alignment
- ▶ Do a 3-Star Alignment
- ▶ Refine Stars - use at least 11 for a very good Pointing Model -> Unguided!
- ▶ Enable Dual Axis Tracking!
- ▶ Goto Objekt - and START!



IMAGES

RASA 1111

OBJECT: MESSIER 33

Optics ▶ Setup:

RASA 11" + Nikon D810A
1.59" per Pixel

Camera ▶ Nikon D810A @ ISO400

Full frame 36,3MP
18x180sec | Flat / Bias / Dark

Mount ▶ 10 Micron GM 2000HPS | unguided Guider for Dithering







OBJEKT: NGC 7023 + VDB 141

Optics ▶ Setup:
RASA 11" + Nikon D810A
1.59" per Pixel

Camera Nikon D810A @ ISO400
Full frame 36,3MP
36x180sec | Flat / Bias / Dark

Mount 10 Micron GM 2000HPS | unguided
Guider for Dithering







OBJECT: NGC 281

Optics ▶ Setup:
RASA 11" + Nikon D810A
1.59" per Pixel

Camera Nikon D810A @ ISO400
Full frame 36,3MP
23x180sec | Flat / Bias / Dark

Mount 10 Micron GM 2000HPS | unguided
Guider for Dithering







OBJECT: NGC 281

- Optics** ▶ Setup:
RASA 11" + Nikon D810A
1.59" per Pixel
- Camera** Nikon D810A @ ISO800
Full frame 36,3MP
20x180sec | EL Film Flat / Bias / Dark
- Mount** 10 Micron GM 2000HPS | unguided
Guider for Dithering





OBJECT: IC1805 IN H-ALPHA

Optics ▶ Setup:
RASA 11" + FLI ML16200
1.99" per Pixel

Camera FLI ML16200 @ -30°C + Baader UFC
+ H-Alpha f/2 Filter
15x300sec | EL Film Flat / Bias / Dark

Mount 10 Micron GM 2000HPS | unguided
Guider for Dithering





Star UFC + H-Alpha f/2 Filter | 75min | © Christoph Kaltseis



OBJECT: NGC7000 IN H-ALPHA

Optics ▶ Setup:
RASA 11" + FLI ML16200
1.99" per Pixel

Camera FLI ML16200 @ -30°C + Baader UFC
+ H-Alpha f/2 Filter
18x300sec | EL Film Flat / Bias / Dark

Mount 10 Micron GM 2000HPS | unguided
Guider for Dithering





OBJECT: IC1805 IN H-ALPHA + O3

- Optics** ▶ Setup:
RASA 11" + FLI ML16200
1.99" per Pixel
- Camera** FLI ML16200 @ -30°C + Baader UFC +
H-Alpha + O3 f/2 Filter
Each 15x300sec | EL Film Flat / Bias /
Dark
- Mount** 10 Micron GM 2000HPS | unguided
Guider for Dithering





RASA IMAGE TRAIN

You will like it!



RASA 11"

THANK YOU & HAVE FUN



RASA 11"

BY CHRISTOPH KALTSEIS © 2016 FOR BAADER PLANETARIUM