Course plan

Week	First half of evening	Break	Second half of evening
1	Introduction & basics		Basics inside PHP
2	Wide angle photography		Targets in the planetarium
3	Processing Software		Sun, Moon & planets
4	Small 'scope observing (may change due to weather)		Small 'scope observing
5	Observing with 28"		Video astronomy (time permitting)
6	Zoom lenses & telescopes		Participants photo's

Cafe is open 6pm-8:30pm!

Astrophotography

for beginners

Image Processing

Image processing to improve your astronomy photographs

- *process your images* using software to adjust the final result e.g brightness, contrast, saturation, etc

- *calibrate your images* to remove imperfections in the camera (dark, bias & flat fields)

- *stack multiple images* together to make one good photograph

IrfanView

- Free software for basic image processing

- For example, by changing the colour balance, you can minimise the effect of light pollution (Image menu > Colour corrections)

- Sodium street-lights are orange, so they give off lots of red light and some green. Try changing the colour balance (e.g. red -50, green -15, blue 0) to minimise the effect of light pollution

- Experiment with changing the brightness & contrast too

Dark frame
taken with lens cap on
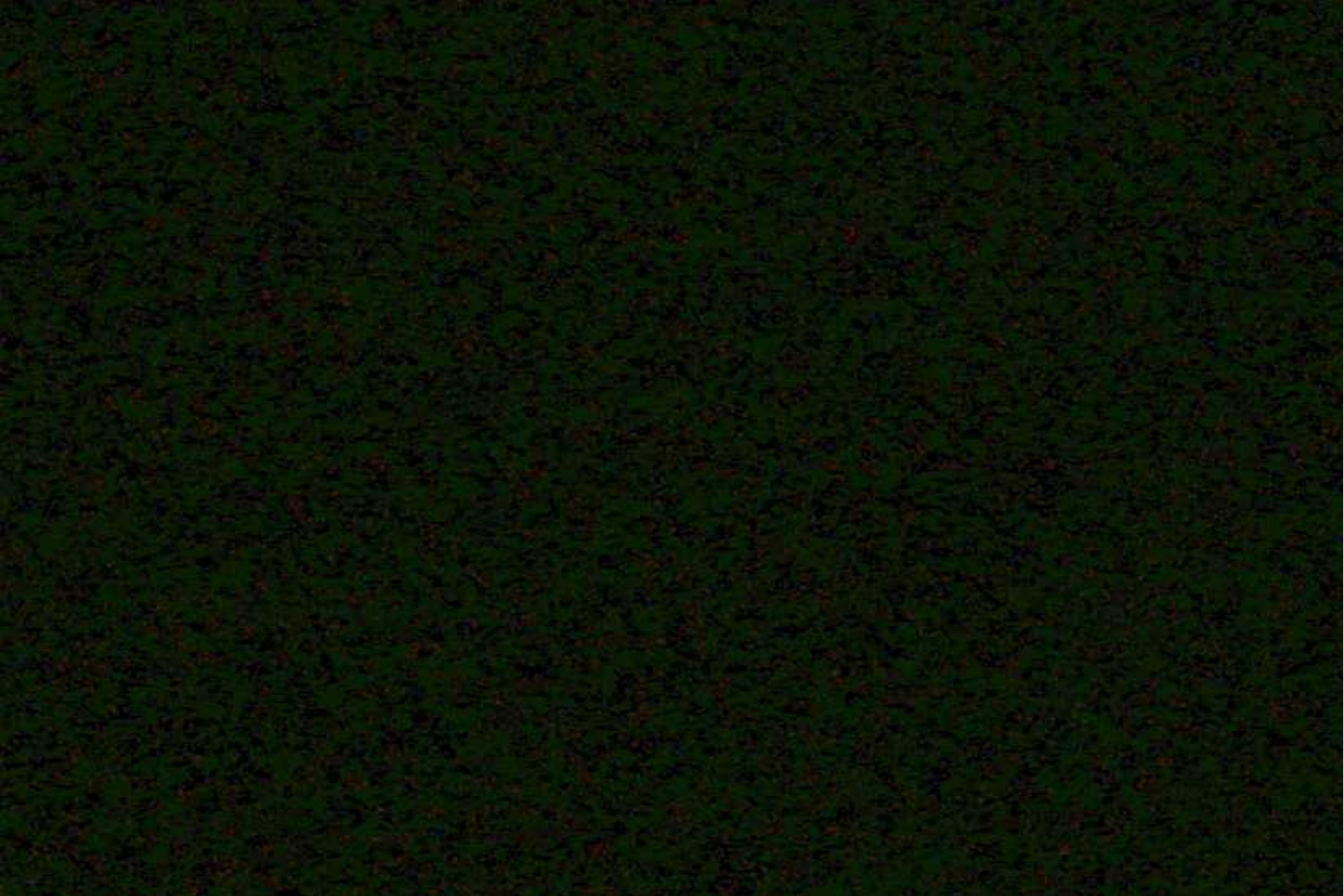
Offset/Bias frame

A zero second exposure

Flat field - Photo of
a smooth white surface

Calibration of images

Dark frame

- an identical photo taken with the lens cap on, to just photograph the camera's imperfections (some of which increase with time)

    - Must ALWAYS subtract a dark frame from starry photo's

Offset/Bias

- a zero exposure photograph, which is a photograph of the noise inherent in the camera chip (optional)

Flat field

- compensates for parts of the detector being more sensitive than others, and vignetting inherent in the lens (optional)

Improving the final result

Brightness
- Makes pixels brighter or darker

Contrast
- Changes the difference between bright and dark points

Saturation
- Changes how colourful the image is

Colour balance
- Makes an image more or less red/green/blue

Gamma correct
- Makes mid-colours brighter or darker

Free software to calibrate astrophoto's

Star Trails: **startrails.de**
    - Stacks (overlays) individual images

Deep Sky Stacker: **deepskystacker.free.fr**
    - Registers (aligns) & stacks images (similar, but simpler than RegiStax)

Free software to improve astrophoto's

Irfan View: **irfanview.com**
    - A large range of image processing tools


GIMP: **gimp.org**
    - GNU Image Manipulator Program: a free clone of photoshop

Deep Sky Stacker

- Instead of taking one long exposure (e.g. 10 minutes), take multiple short exposures (e.g. twenty 30 second exposures)

- This allows you to use one short calibration (dark) frame on each image, rather than taking one long one

- This software can also correct for the motion of the stars across the sky, and so you do not need a tracking mount

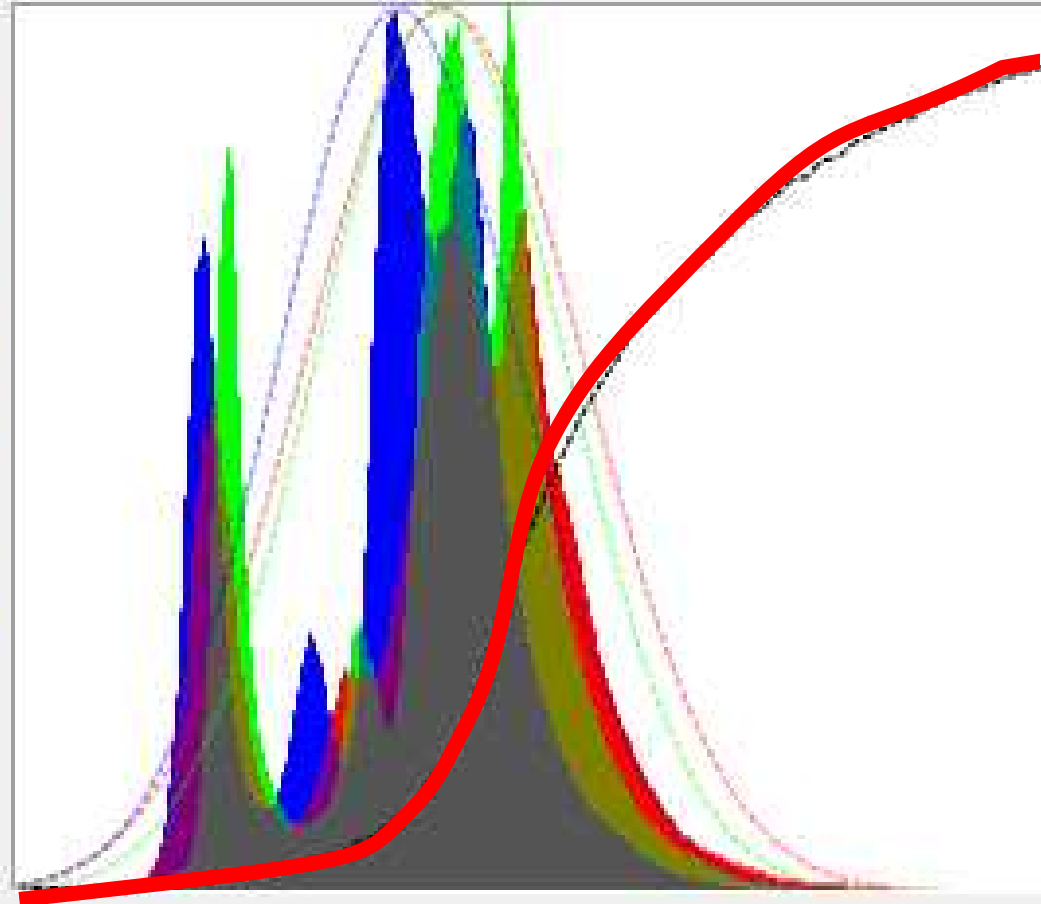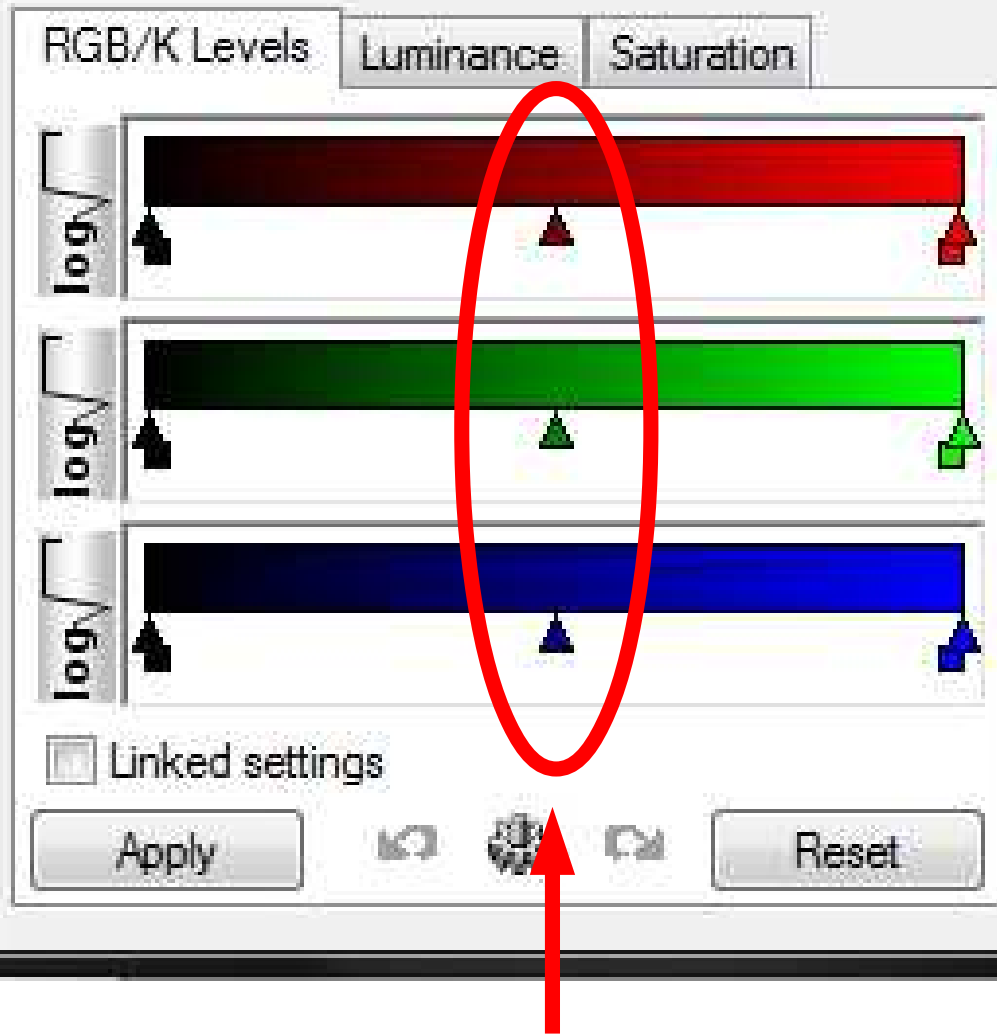*- DSS can also do some colour balance image processing*
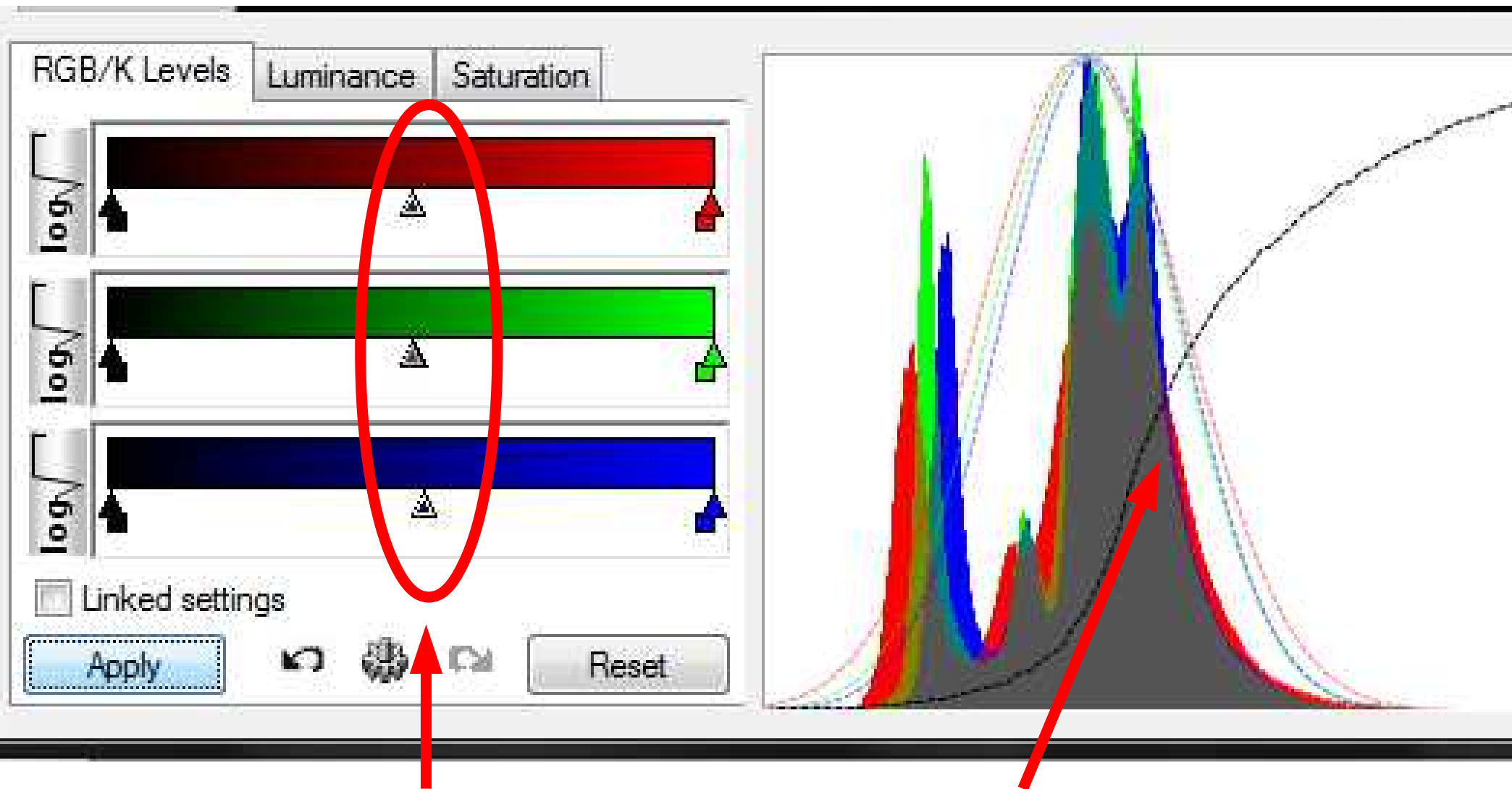
Deep Sky Stacker
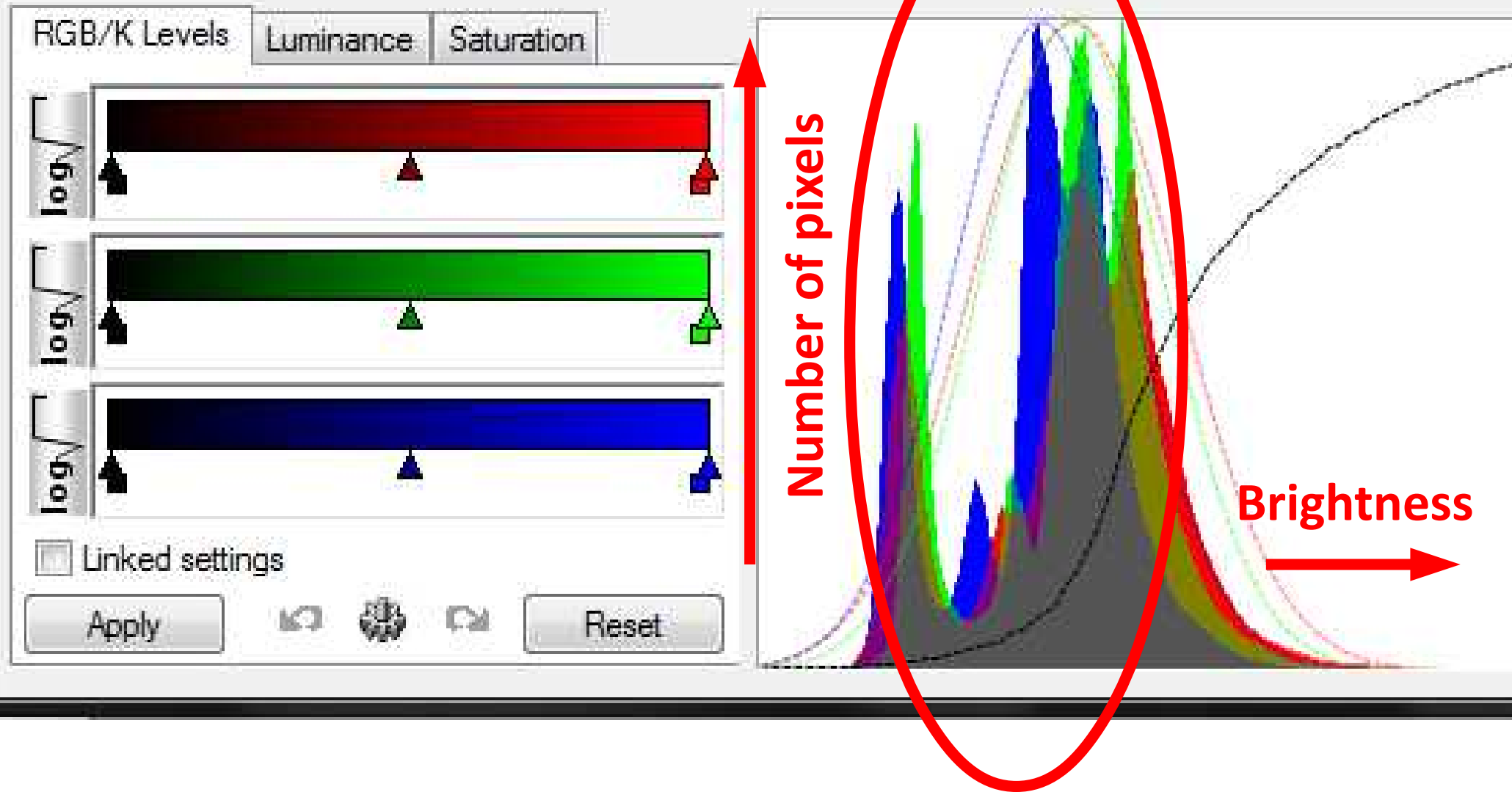
Number of pixels at a given colour and brightness

Everything above the line is ignored

RGB/K Levels | Luminance | Saturation

log√
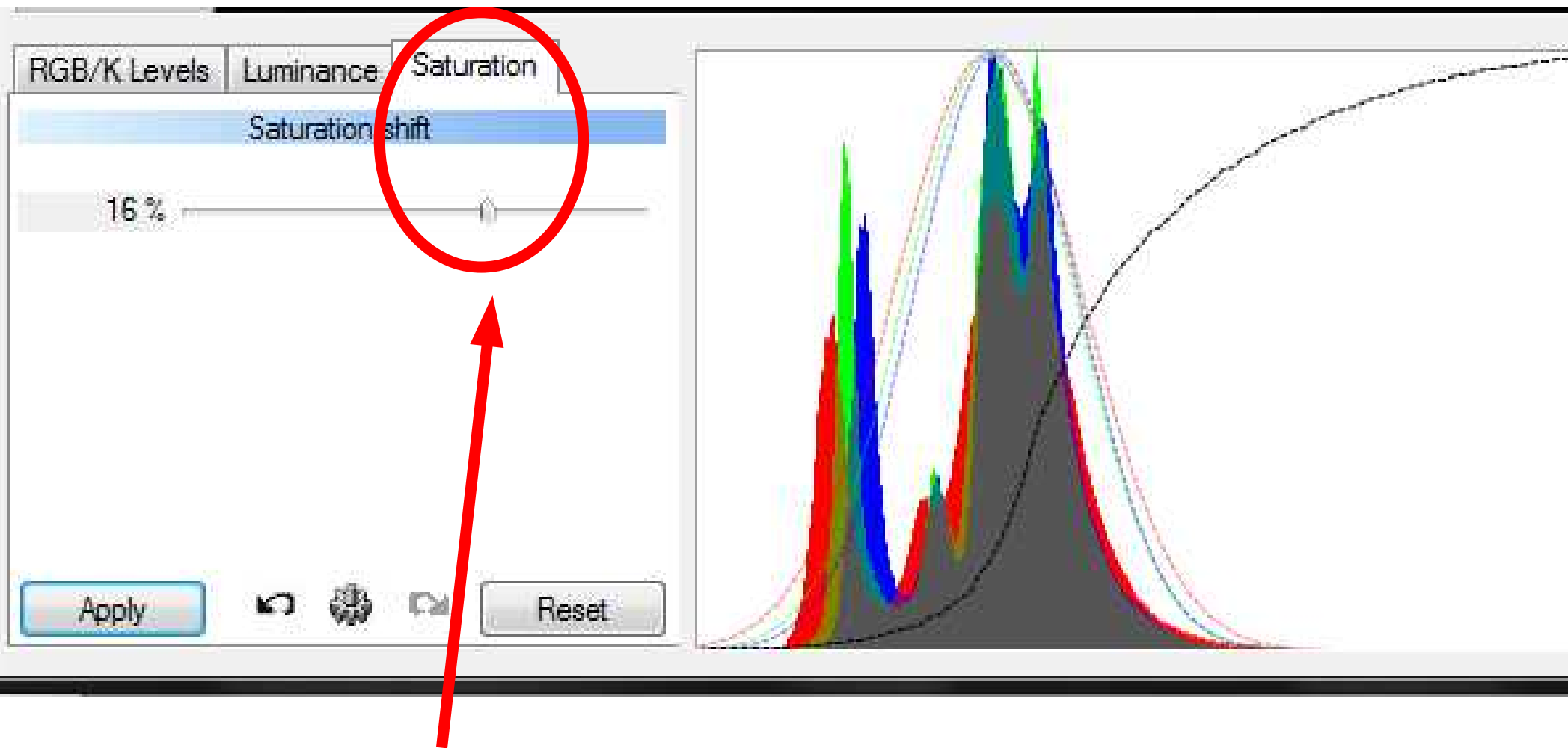
log√

log√

Linked settings

Apply | Reset

Move these sliders to include more or less of a particular colour
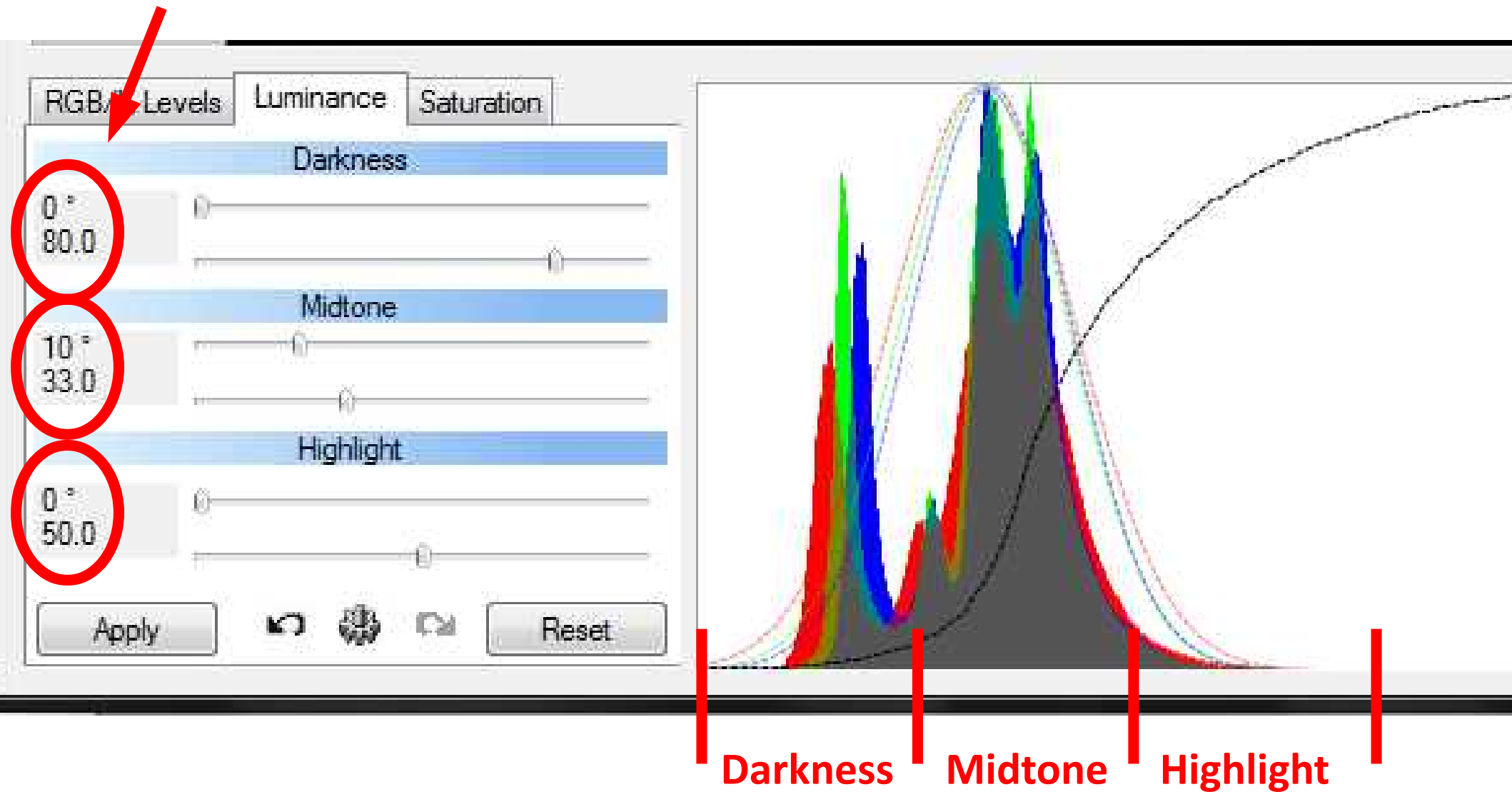
Move these sliders to line up the colours here

Increase the colour a bit

Change angle and offset of curve in each zone, using sliders

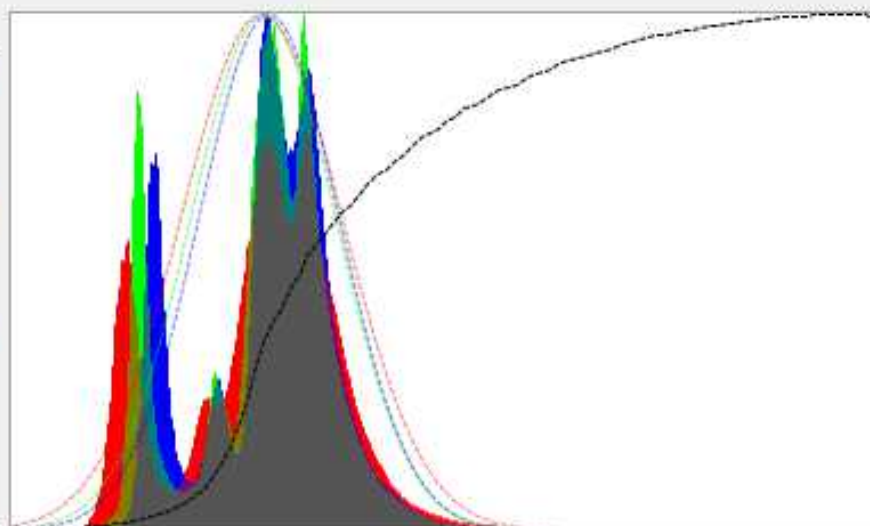RGBA Levels | Luminance | Saturation

Darkness
0 °
80.0

Midtone
10 °
33.0

Highlight
0 °
50.0

Apply   Reset

Darkness   Midtone   Highlight

RGB/K Levels | Luminance | Saturation

Darkness

0 °
80.0

Midtone

10 °
27.5

Highlight

0 °
50.0

Apply   Reset

Software for Mac's
Note: I have no experience of using any of these!

StarStaX: **www.markus-enzweiler.de/StarStaX/StarStaX.html**
  - *Stacks (overlays) individual images*

Keiths Image Stacker: **keithwiley.com/software/keithsImageStacker.shtml**
Astrostack: **www.astrostack.com/home.html**
  - *Registers (aligns) & stacks images from a video*

PixInsight commercial software: **pixinsight.com**

Astrophotography
for beginners

www.DarrenBaskill.co.uk/a4b