a very quick introduction to
processing of images
acquired through the use of
non-monochromatic imaging devices
commonly known as

“One Shot Color Cameras”

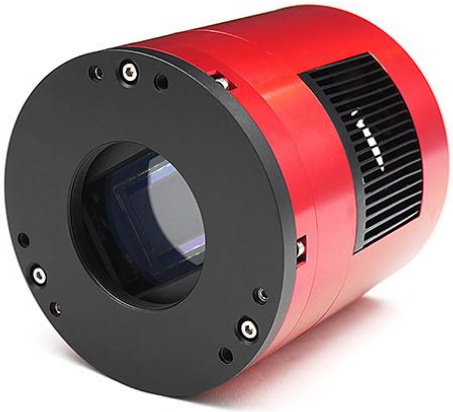
the hardware

Sensors Variety:

- CCD
- CMOS

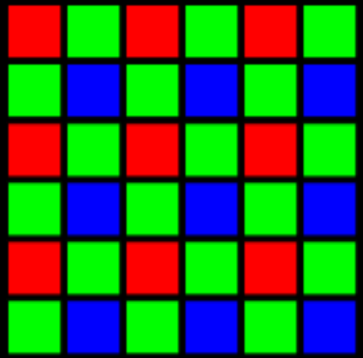
Camera Designs:

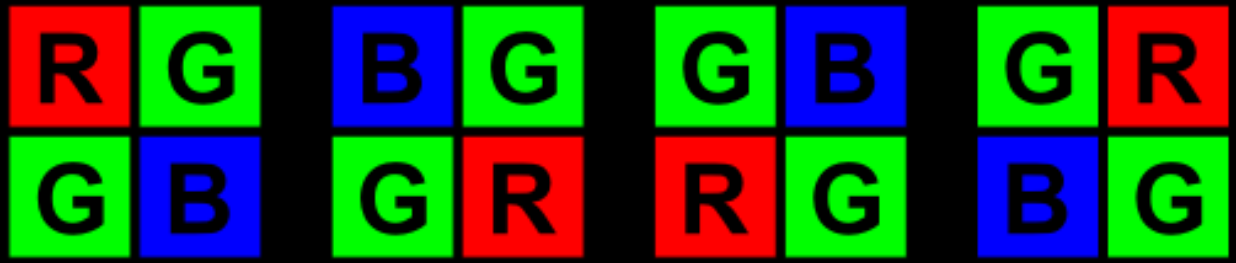
- DSLR
- Mirrorless
- Astronomy/Scientific Dedicated Designs



one thing all color cameras have in common

“Bayer Color Filter Pattern”

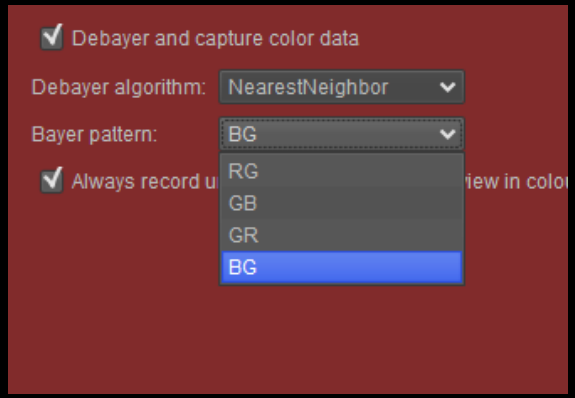




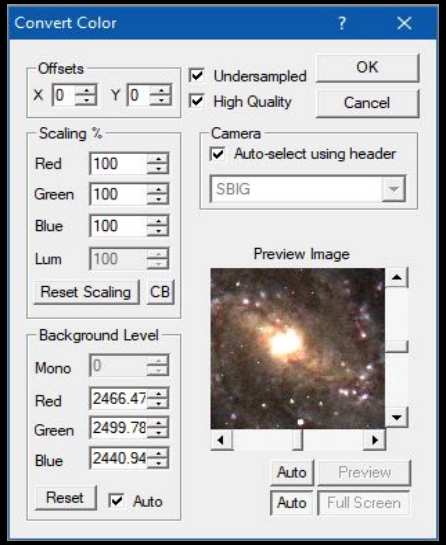
https://en.wikipedia.org/wiki/Bayer_filter

once the individual subframes are calibrated, it is time to remove the Bayer Pattern using a

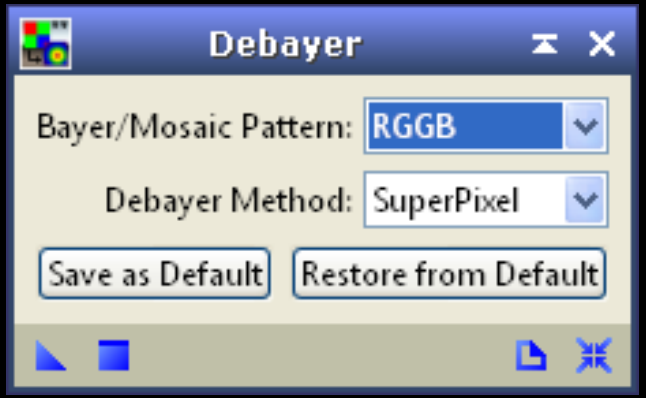
“Debayer Method”



FireCapture



MaximDL



PixInsight

https://pixinsight.com/doc/tools/Debayer/Debayer.html

the workflow…

Linear Stage:

- Calibration (Bias, Dark, Flat) (performed on individual subs)
- Debayer (performed on individual subs)
- Bad Pixel Removal (performed on individual subs)
- Registration (Alignment of the subs) (performed on individual subs)
- Integration (Stacking subs to create a master) (performed on individual subs)
- Gradient Removal (performed on Master)
- Color Calibration (Balance) (performed on Master)
- Deconvolution (performed on Master Luminance only)

  (if intended, then a Luminance channel must be extracted at this point)
- Stretching the image (Color Master and Luminance Master if you had created it)

Non-Linear (Stretched) Stage:

- Recombine Luminance (if it exists) to Color Data
- Noise Removal, Sharpening, additional color adjustments, etc.…

Is it worth it…

Quick Discussion:

Pros

Cons

Tie

Topics:

1. Ease of use
2. Cost
3. Sensitivity
4. Image Quality
5. Narrow Band
6. Motion (e.g. comets, eclipses..)

examples…

Clusters

M45
Tak 106ED f3.6
SBIG ST2000C
7 x 10 min = 70 min

2007-09

examples…

Clusters

NGC869
Tak 106ED f3.6
SBIG ST2000C
10 x 5 min = 50 min

2007-12

examples…

Galaxies

M83
Tak 106ED f8
SBIG ST2000C
22 x 15 min = 330 min

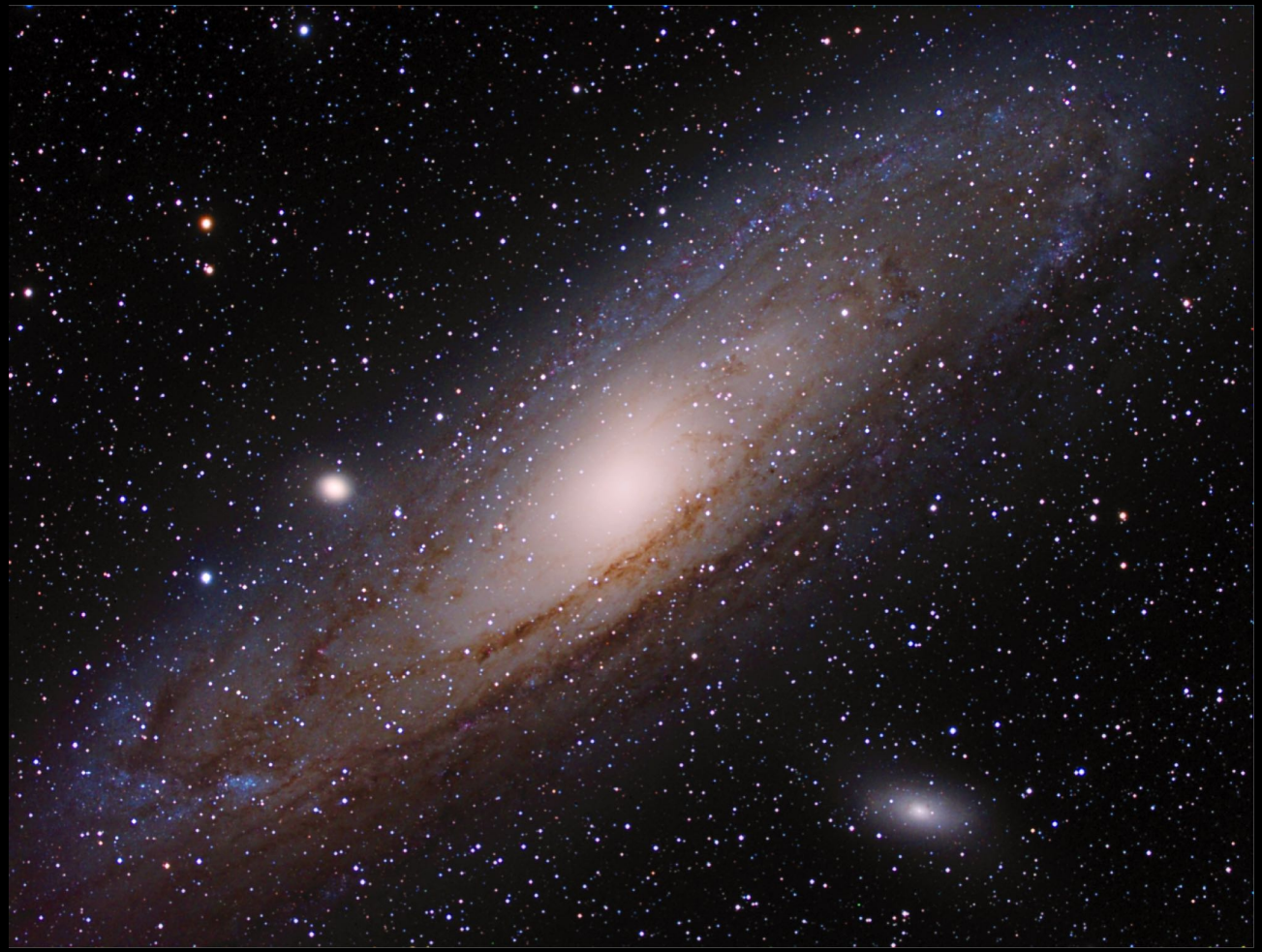
2009-04

examples…

Galaxies

M31
Tak 106ED f3.6
SBIG ST2000C
10 x 10 min = 100 min

2007-11



examples…

Nebulae

M8
WO 80FL f6
SBIG ST2000C
5 x 30 min = 150 min

2007-06

examples…

Nebulae

M20
WO 80FL f6
SBIG ST2000C
15 x 20 min = 300 min

2007-06

examples…

Comets

Comet Holmes
Tak 106ED f3.6
SBIG ST2000C
1 x 10 min = 60 min

2007-11

examples…

Narrow Band

Sh2-240

Tak 106ED f3.6

SBIG ST2000C

12 Tiles Mosaic

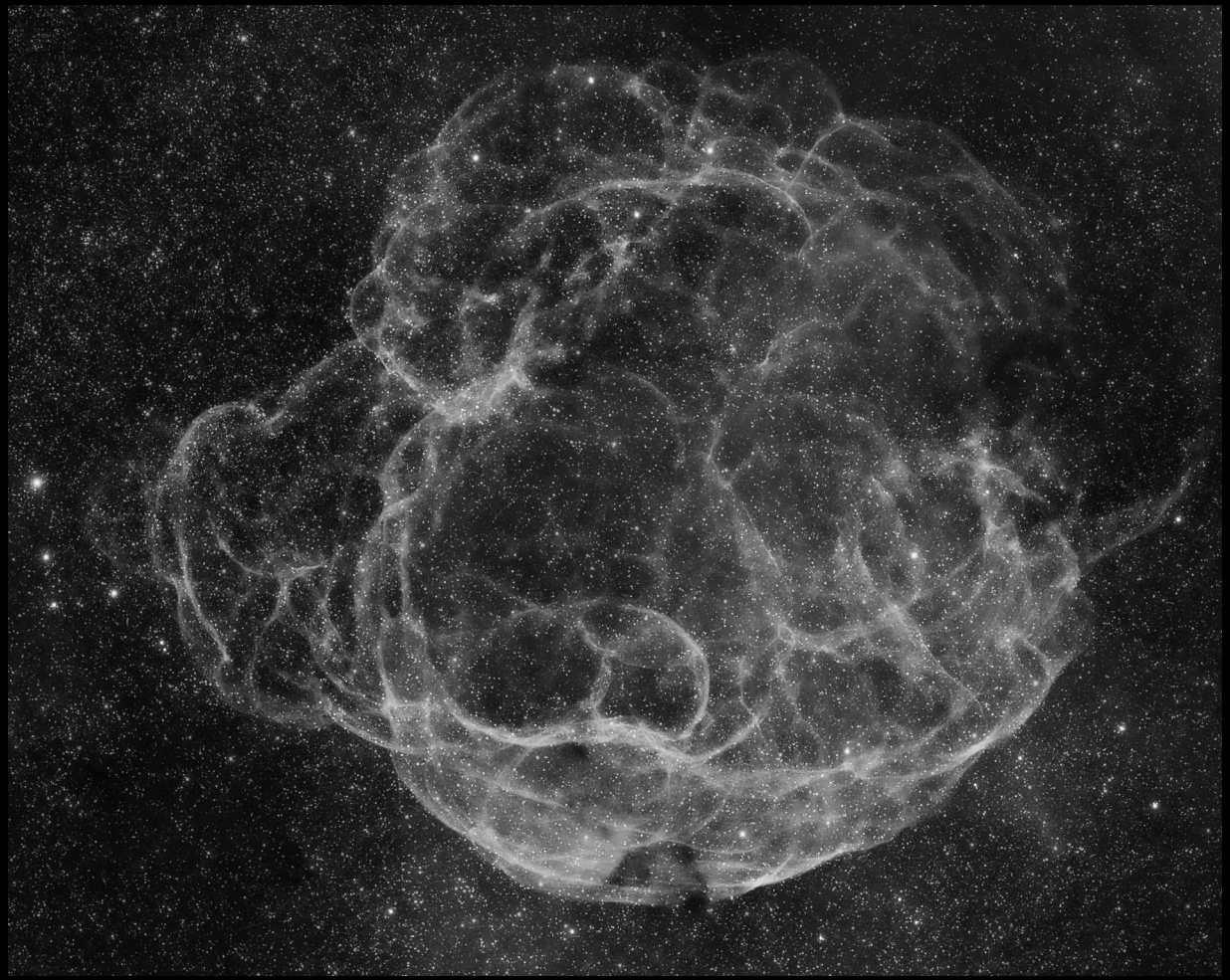
Ha 12 x 15 min = 180 min/tile

Total = 36 hours

“Ha” is obtained by separating the image to the RED, Green , Blue channels.

Use the Red only as Ha.

2008-12



examples…

Narrow Band

NGC2244

Tak 106ED f3.6

SBIG ST2000C

Ha 12 x 15 min = 180 min

Oiii 8 x 15 min = 120 min

Sii 8 x 15 min = 120 min

Ha from Red

Oiii from Green & Blue

Sii from Red

Then Recombined as

Sii = Red

Ha = Green

Oiii = Blue

2007-12

and now…

Processing Examples

Tour of M83 processing using:

MaximDL
Photoshop

PixInsight