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TONE MAPPING

A powerful tool for narrowband Color Combine,

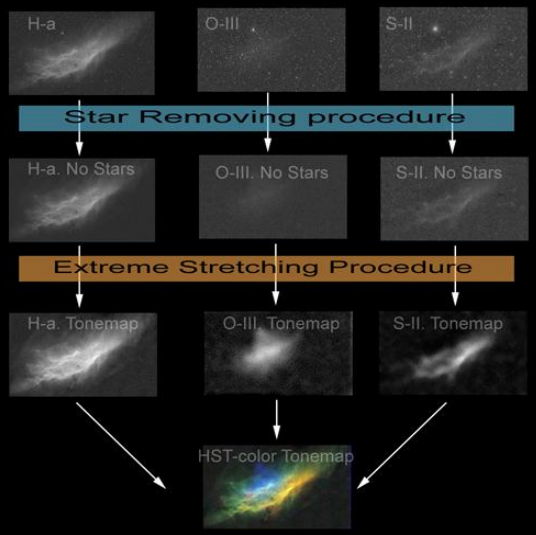
by J-P Metsavainio.

General notes

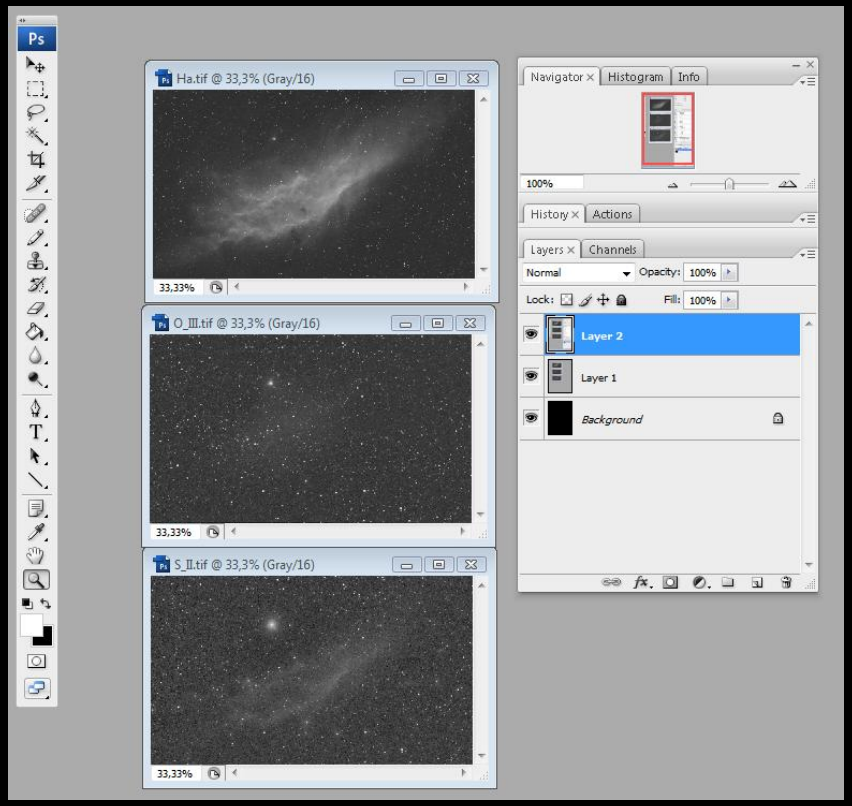
- Stars contains no relevant color information in Narrowband imaging
- H-a channel alone can’t be used as a Master Luminace, since it contains no information from the other bands.
- All images must be well calibrated and gradient free for this technique to work.
- If weaker channels, O-III and S-II, contain detailed structures, be careful not to lose them.

Step I

- Star removing procedure to Calibrated S-II, O-III and H-a frames to generate Tone Maps
- Stretching procedure to the Tone Maps
- HST-palette Color Map from the Tone Maps



Star removing procedure



- All channels opened to a PhotoShop
- Channels have to be Aligned and DDP'd
- Make a copy of the H-alpha channel for the Star removal

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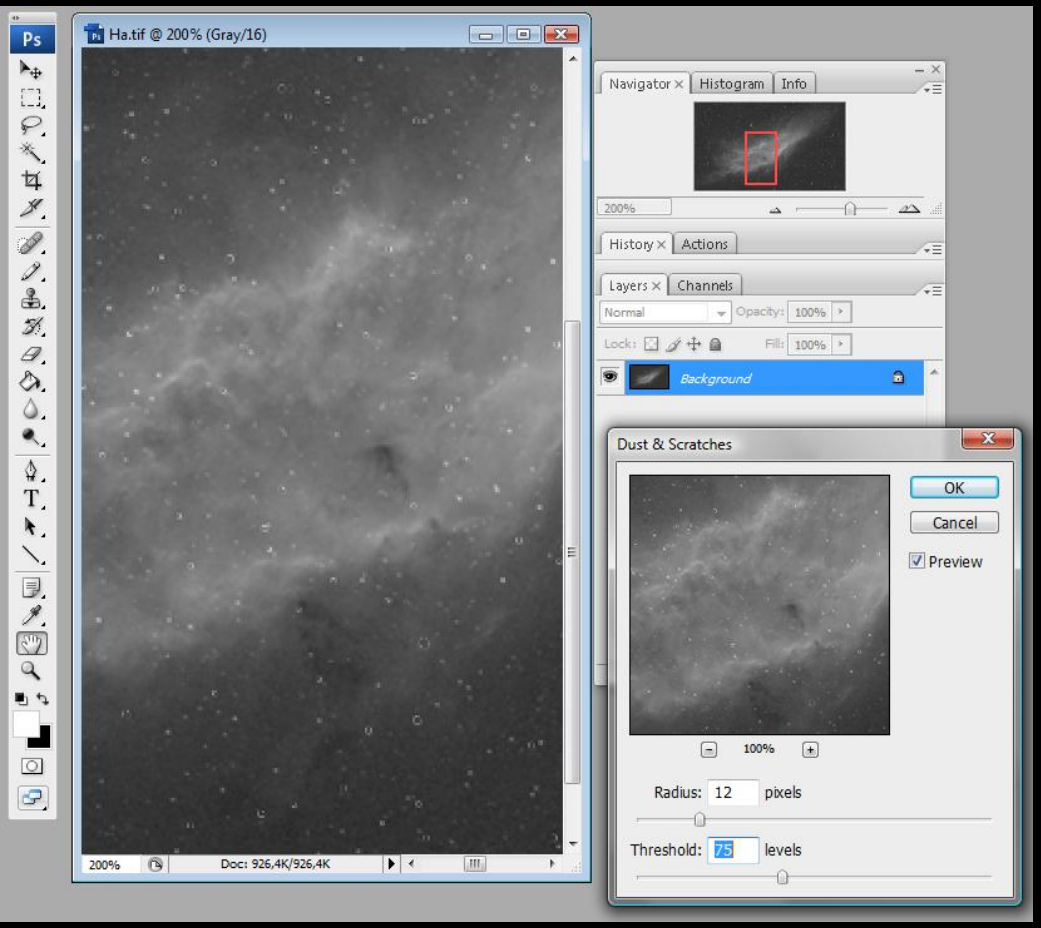
Using ”Dust & Scratches” filter



- Open the ”Dust & Scratches” filter
- Set radius to 12
- Set Threshold to 50-120, by looking enlarged image, so that the center of the brighter stars disappears but image stays ”crispy”.
- Lower radius two points to 10 and set Threshold to 30-80. Follow image quality and details.
- Repeat several iterations with lower values, the more rounds the better.
- In the final step radius should be 1 and the Threshold between 3-10.
- If there are leftovers from brighter stars, use the clone tool to clean them up.

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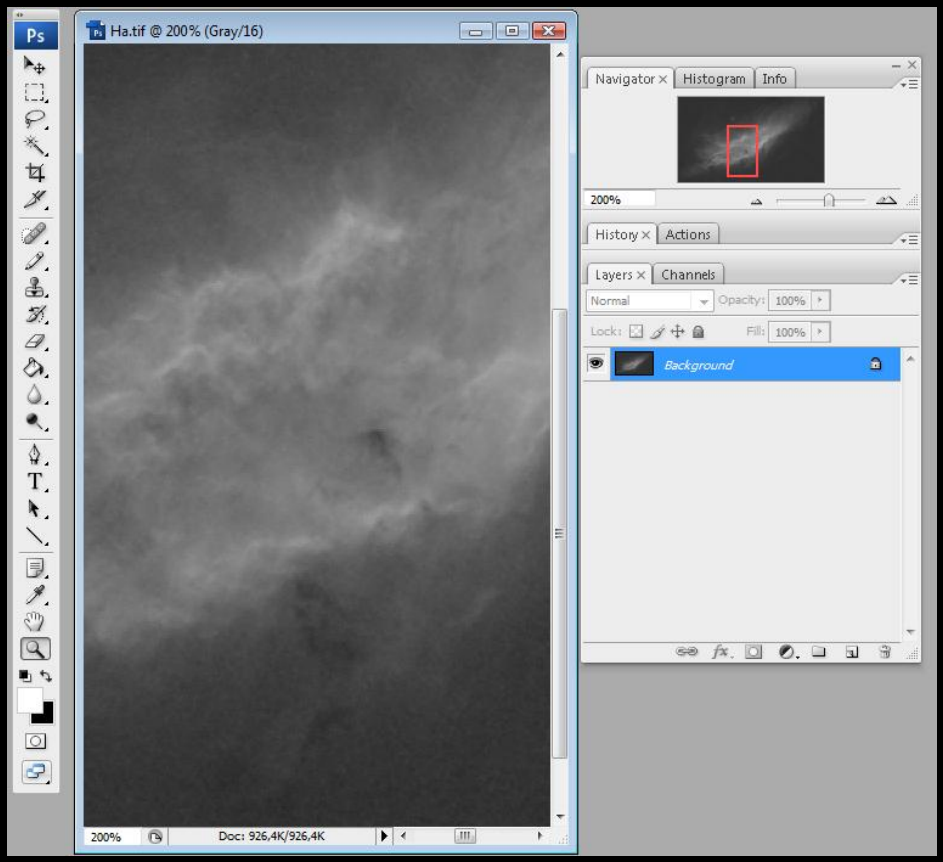
Restoring the lost details



- All Stars are now removed
- There are usually some other missing details as well.
- Place the original H-a image with stars to top of the Starless one.
- Turn blending mode to ”Darken”
- Blink layers to see the effect
- Merge layers
- If some lighter shades are missing, fix them by using the History Brush
- After fixes, blink the image again with the original one, to be sure, that there is no missing details other than Stars!

Repeat previous steps to the all channels

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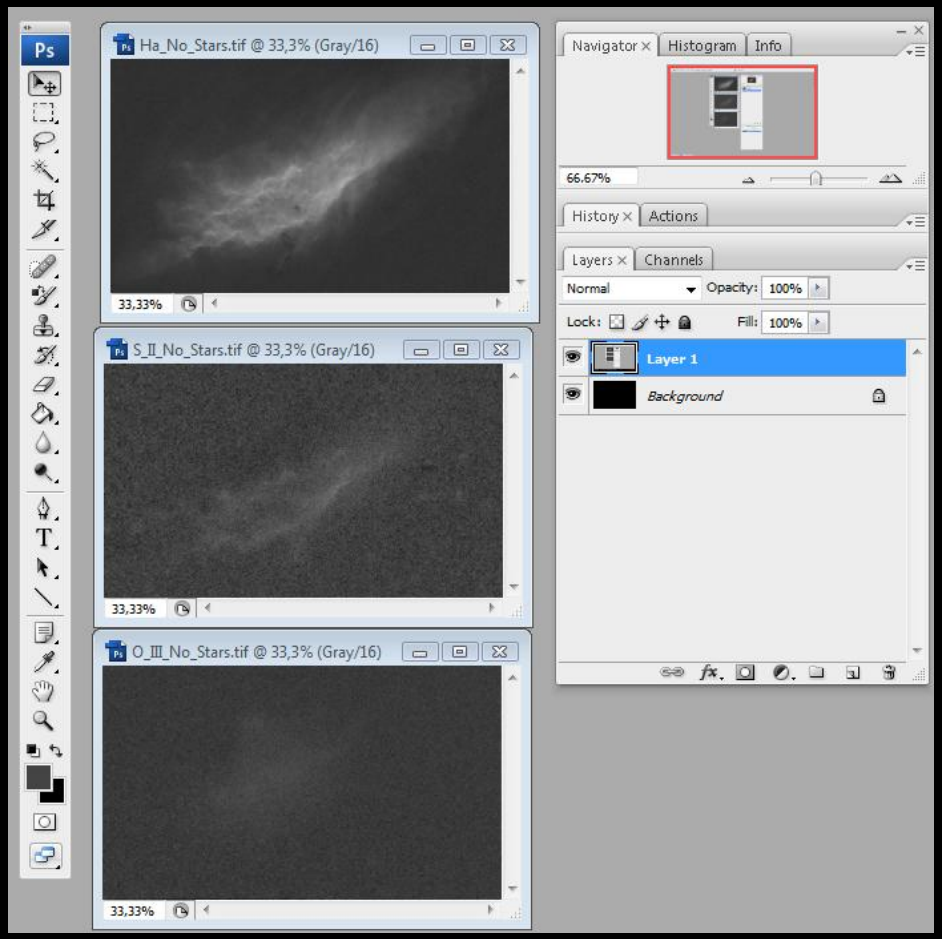
Stretching Procedure



- Now we have three Starless images from H-a, S-II and O-III channels
- Usually there is very litle information in other than H-a channel
- We will do an ”extreme” stretching to weaker channels.
- Since all the Stars are removed, we don’t have to worry about bloating them
- In this example we’ll use the weakest channel, O-III, to show how powerful the method really is

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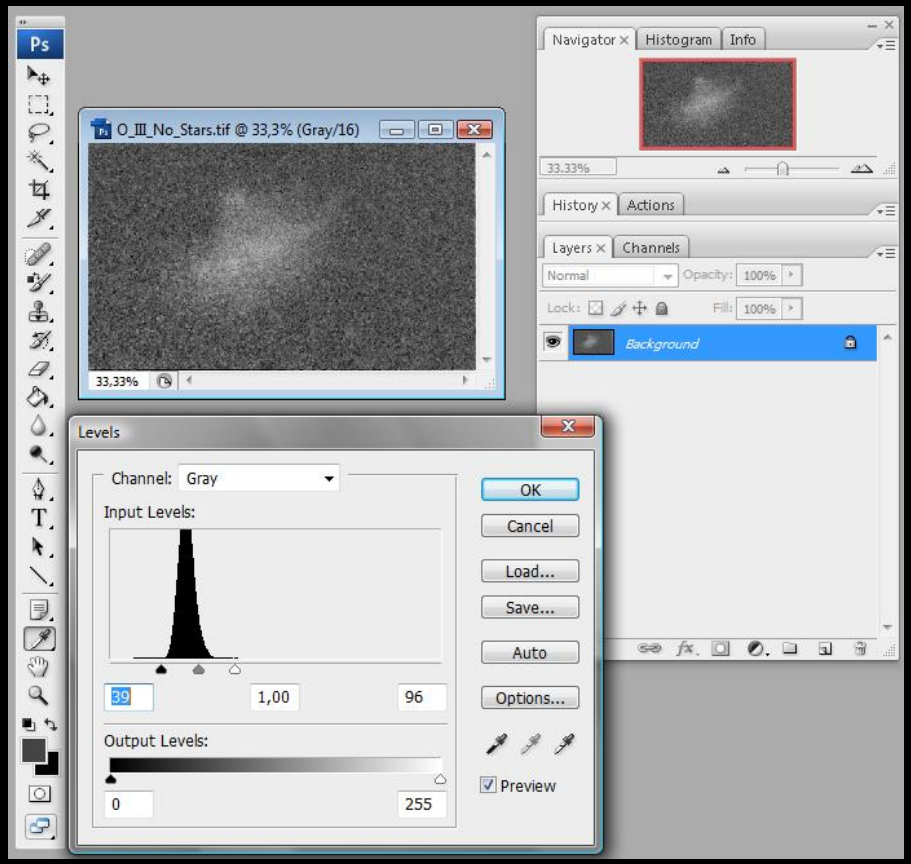
Stretching the Tone Map



- As can be seen in the image, there is plenty of room in the light end of the Histogram due the removed stars.
- First stretch image to maximum values by the ”Levels” tool
- Do couple of iterations rather than all at once.
- After Levels are set, use curves to add some contrast
- Image is now very noisy, but that’s irrelevant since we are working with a Tone Map!

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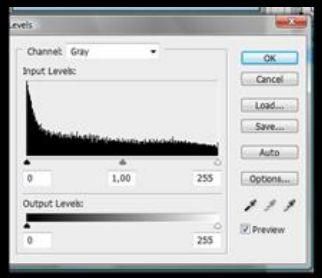
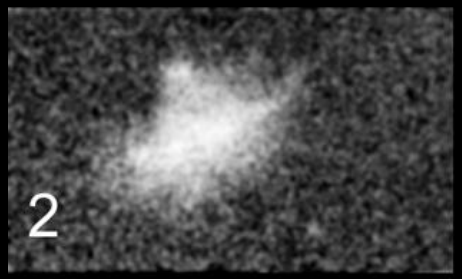
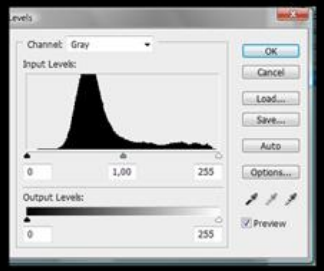
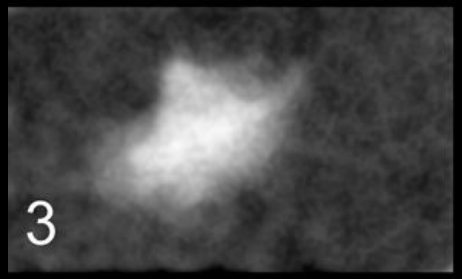
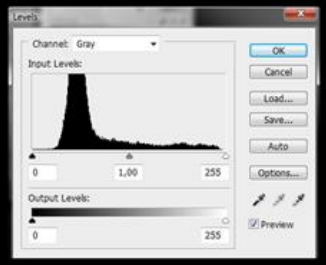
Tone Map Stretching, step two

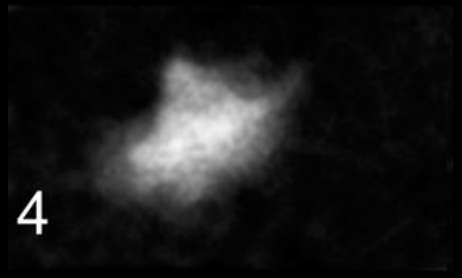


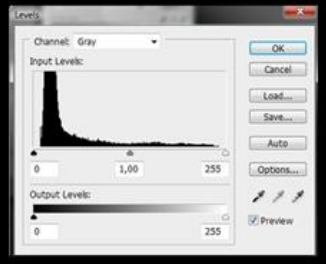












- At image 1, the O-III channel is stretched
- Image 2 shows it after radius 4 Gaussian Blur
- Pay attention to a Histogram window, don’t clip dark and light ends, when setting levels!
- At image 3 ”Dust & Scratches” is used again to smooth out background. Radius 24 and Threshold 16. You might need to try different values here. Gaussian Blur with radius 3 is added after the filtering.
- Image 4 is a final Tone Map for the O-III channel. Set contrast by using curves. Don’t clip shades!

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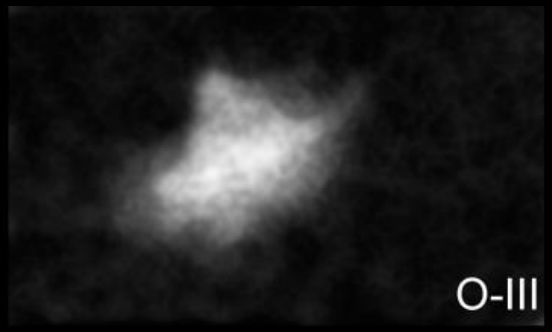
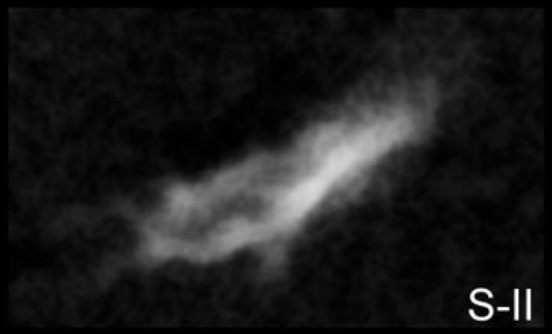
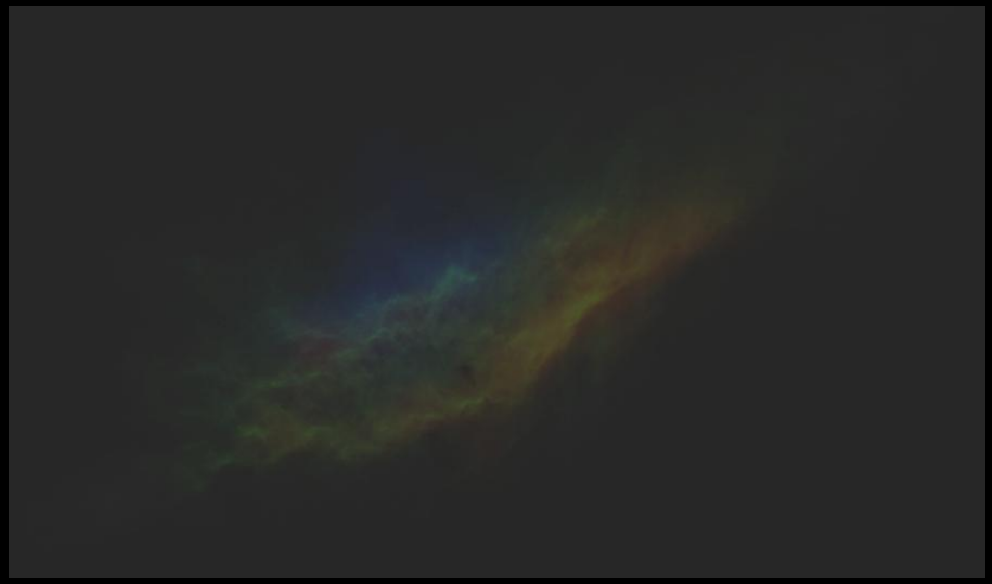
Tone mapped channels to a RGB-image



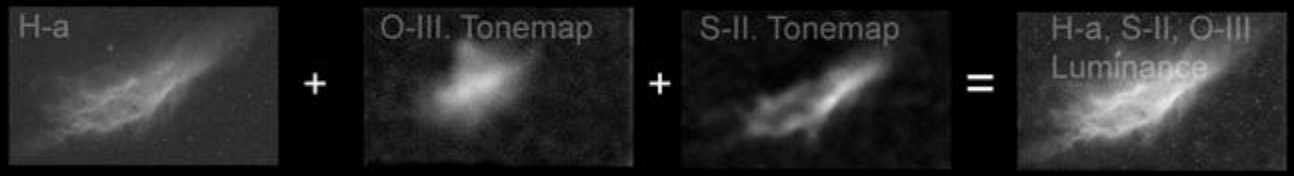


- Previous step is added to all of the channels
- Do it easy with H-a, since usually it’s the strongest channel and we don’t want it to dominate the color palette!
- Merge Tone Map channels to a RGB-image, in this case to a HST-palette.
- Balance the background color close to neutral.
- Use the ”Selective Color” to balance colors.

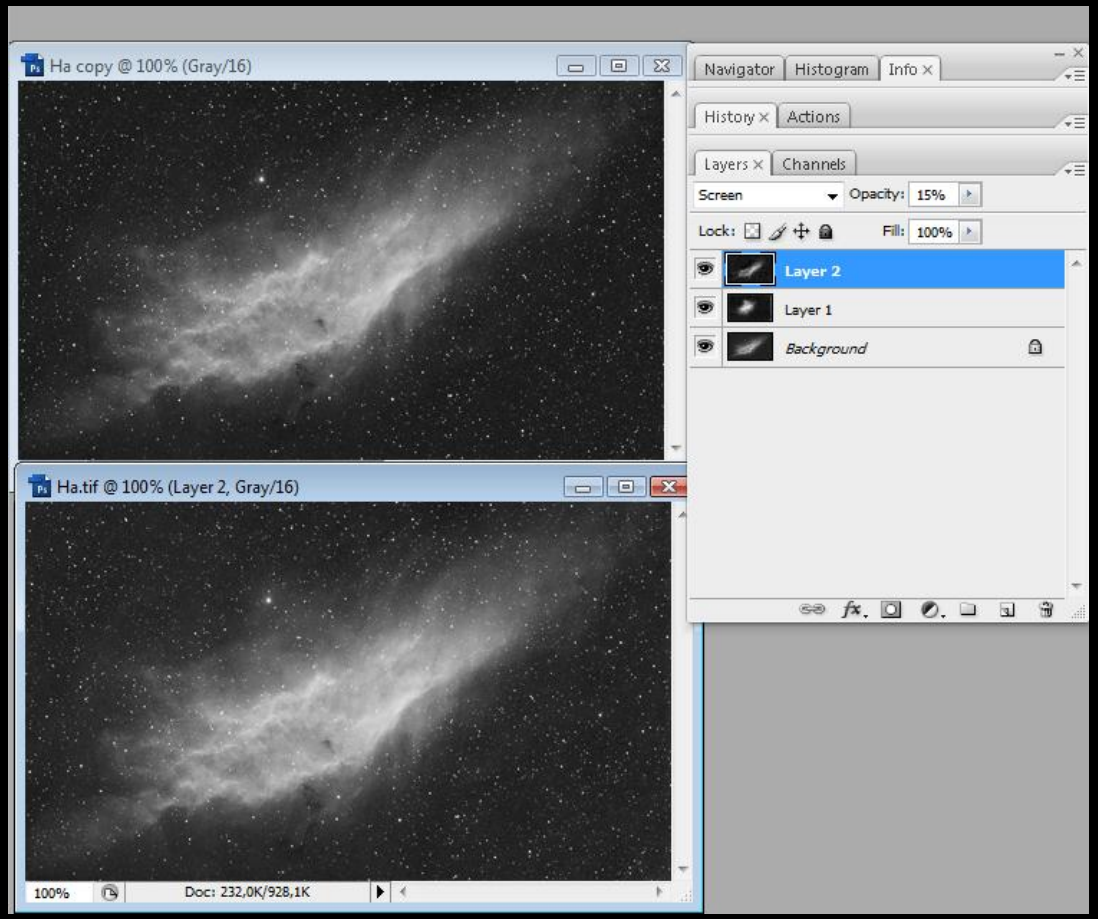


Step II

- Generation of The Master luminance from O-III and S-II boosted H-alpha channel



Turning H-a channel to a Master luminance with Tone Maps



- Place O-III and S-II Tone Maps to a Layers top of the H-a.
- Blending mode to a ”Screen”
- Set opacity about 10-15% (If you have an information about real relations between signal strenghts, that value should be used)
- Flatten image.
- Tweak Levels and Curves, avoid clipping.
- Save image as a Master Luminance

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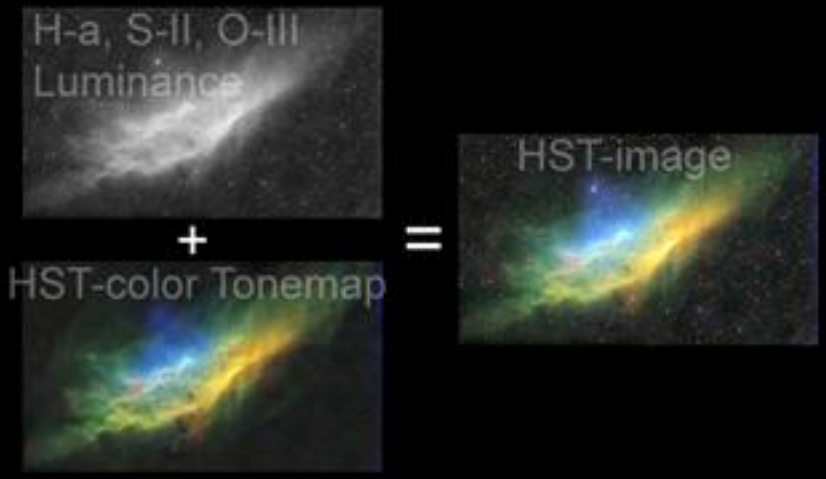
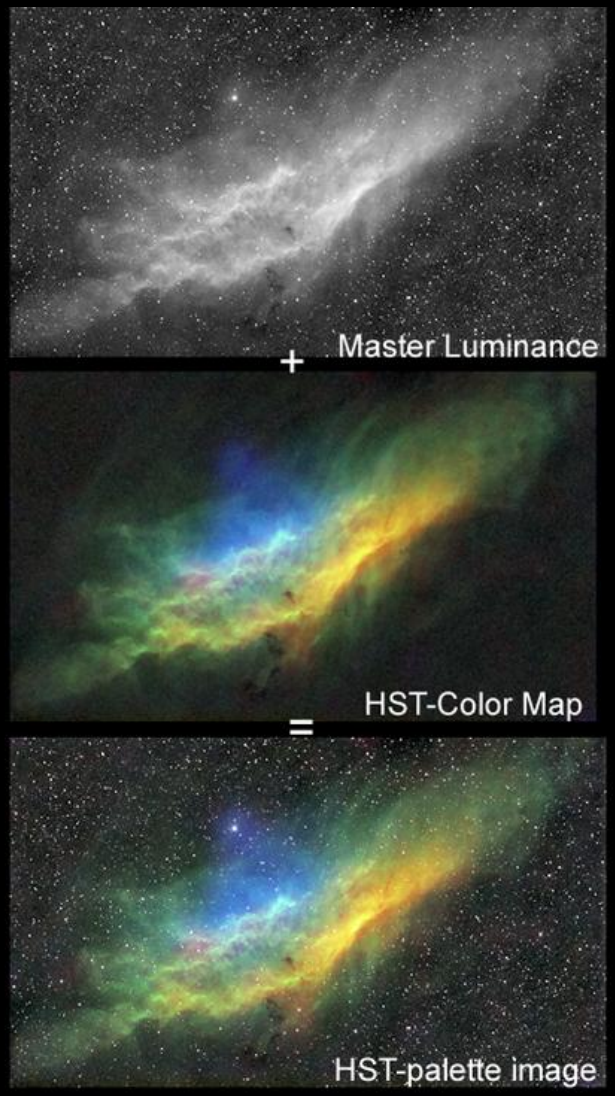
Step III

- Master Luminance and Color Map composition to create a HST-palette image



Combining Color Map and the Master luminance



- O-III and S-II boosted H-alpha channel can be used as a Master luminance, since it contains information from all channels.
- Note! H-alpha alone can not be used as a Luminance without an information lost!

Final Image

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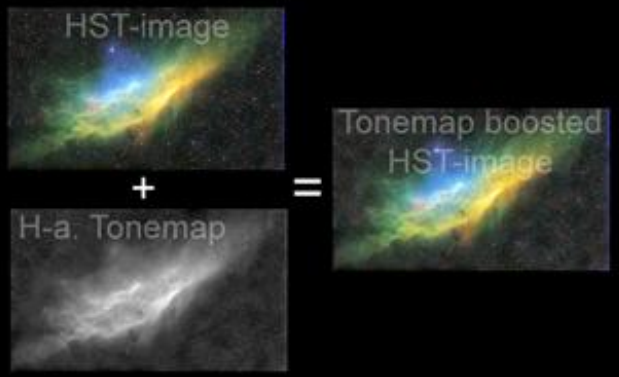
Step IV (Additional)

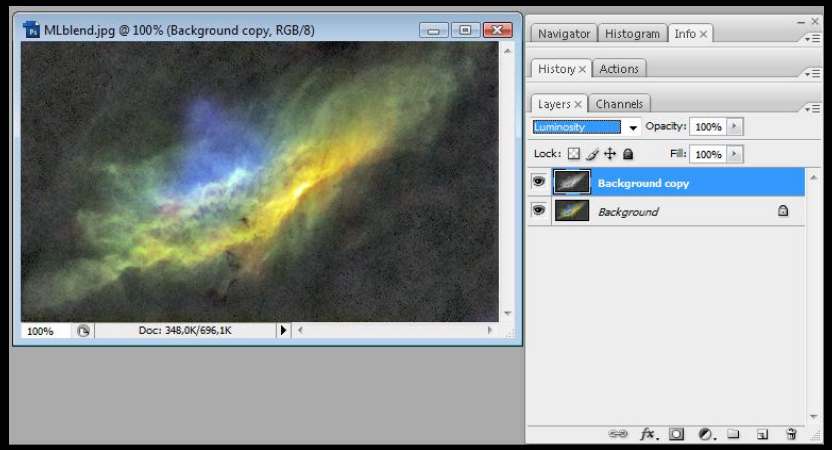
- Greate a S-II and O-III boosted H-alpha Tone Map from the master luminance
- Add stretched Tone Map to a Master Luminance image to improve the faint information
- Star visibility controlling by a Tone Map
- Final, Tone Map Boosted, HST-palette Color Image

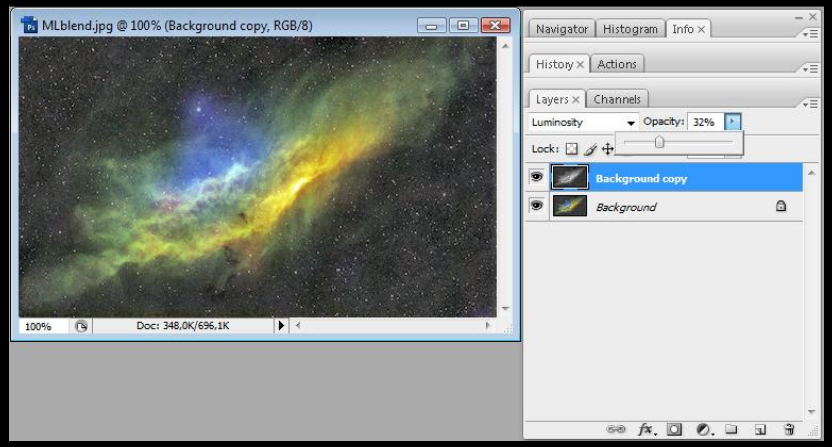


In this additional step we use a Tone Map technique to fine tune the image.

- We can boost the Master Luminance by usin a tonemapped version of it.
- First remove stars from a Master Luminance as presented in Step I
- Secondly stretch the starless master luminance but don’t clip the shades
- Add tonemapped image top of the original Master Luminance image as a Lighten mode.
- Tweak opacity by the taste.
- The resulting image is then used as a Master Luminance, top of the Color Mapped image.

Star dominance controll by a Tone Mapped Master luminance





- Add a Tone Mapped Master Luminance as a Luminance layer to a ready made image.
- Tweak opacity slider to control a star visibility by the taste.

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Final Image