

Stretching Your Photons

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We work hard for our photons

...each one is expensive.



Leveraging color & contrast
gives a discount...



It's the color...



M 82



M 82

Color isn't just for tint

- Color increases clarity
- Color can be used to create luminance



M 82 (full scale)

Stretching your color

- Time your color exposures based on the characteristics of your chip and your filters
- Take unbinned, 1X1 color exposures and create synthetic luminance data

Saturating color data

- Layering luminance data over RGB data typically results in weak color information and gives a washed-out appearance to the image
- Saturating the RGB information restores color vividness
- Saturating can introduce noise that destroys color fidelity

Color noise

- Color noise results in a mottled, orange peeled or overexposed appearance
- Color noise can be managed through smoothing of the color data
- Color noise is obvious by looking at the individual color channels

Color noise- blue channel



Avoiding color nasties

- Expose at least three sets of R, G and B filtered images
 - Use Median combine
- Add smoothing whenever saturating RGB data
- Inspect each color channel frequently
- Best results: use 25% - 33% of total exposure time gathering color information for each channel

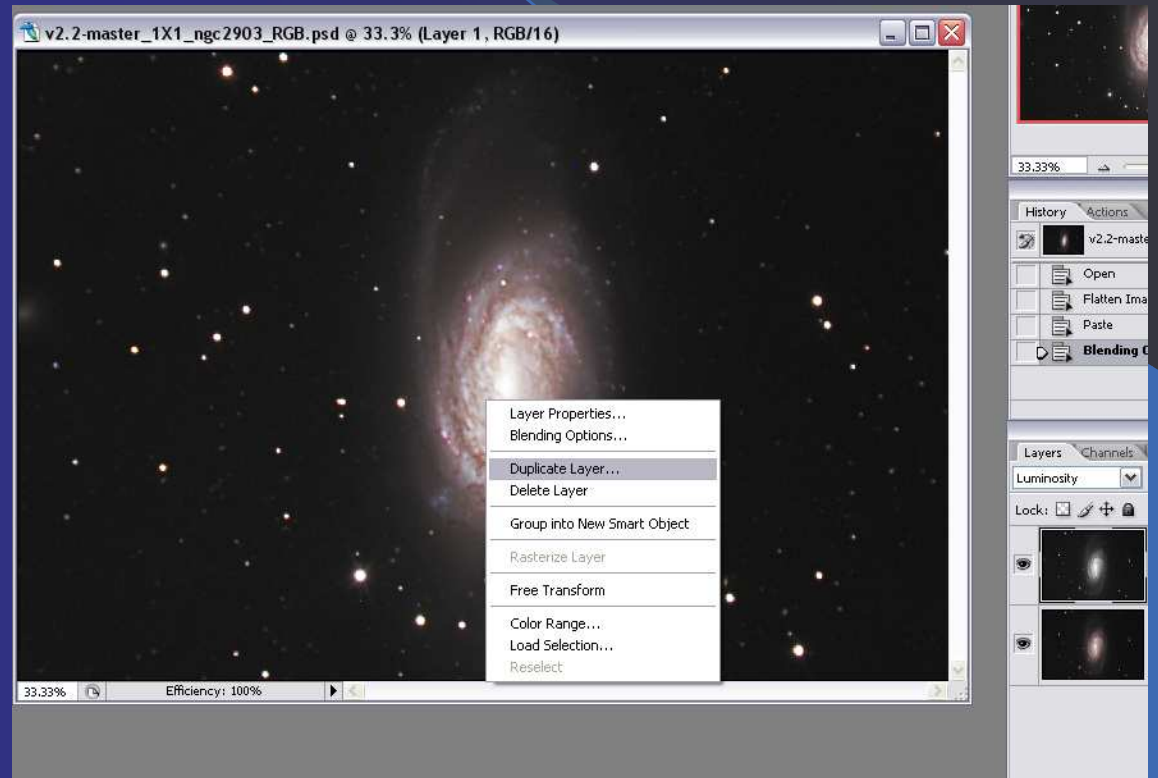
Increase color saturation

Method 1: Layered saturation (first pass)

1. De-select Luminosity layer (top layer)
2. Select Background layer (bottom layer)
3. Right mouse-click on image and select duplicate layer
4. Repeat duplicate layer

This results in four layers:

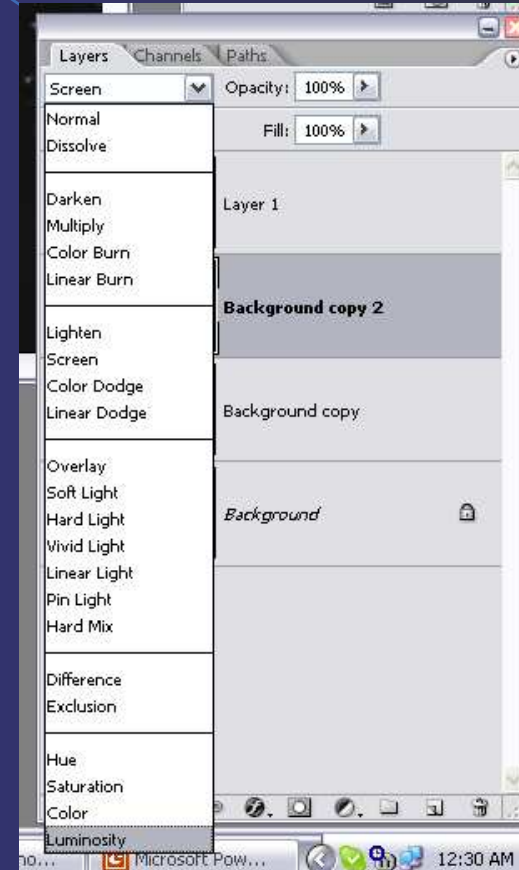
1. Layer 1
2. Background copy 2
3. Background copy
4. Background



Increase color saturation

Method 1: Layered saturation (first pass)

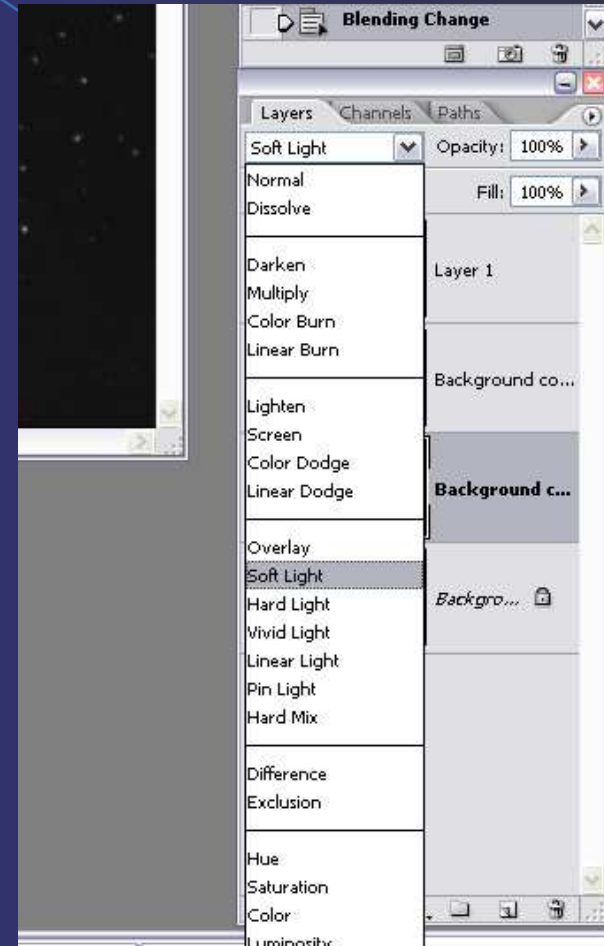
1. Select Background copy 2 layer
2. Change property to **Luminosity**



Increase color saturation

Method 1: Layered saturation (first pass)

1. Select Background copy layer
2. Change property to Soft Light



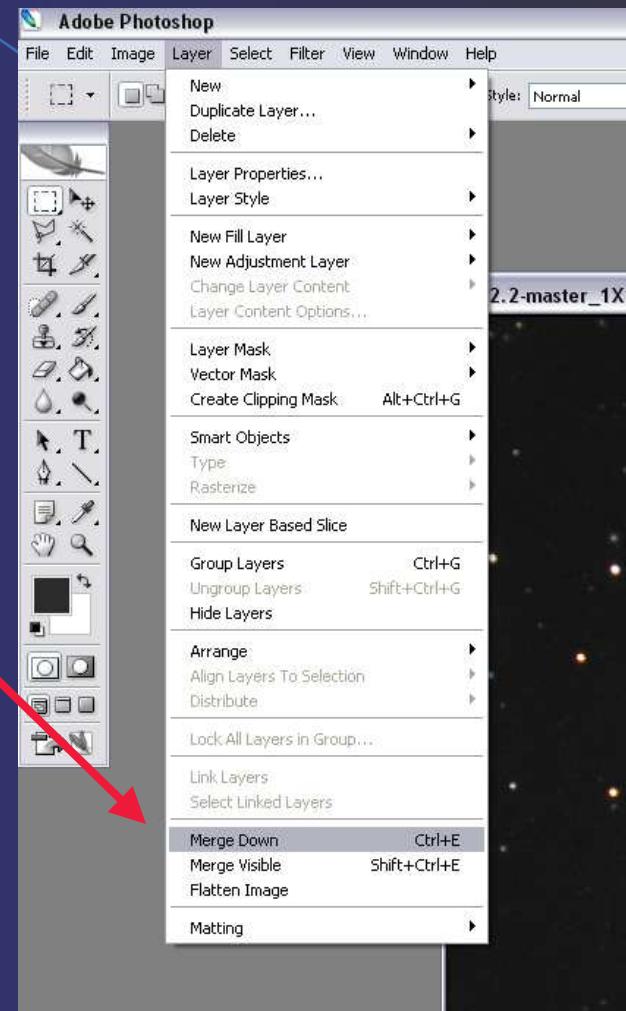
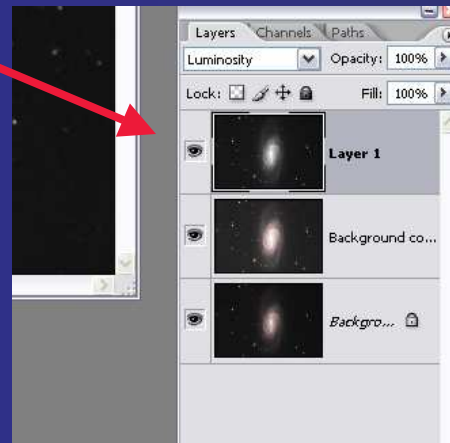
Increase color saturation

Method 1: Layered saturation (first pass)

1. Select Background copy 2 layer
2. **Merge Down** Background copy 2 layer onto Background copy layer

The image will appear dark, so...

3. Re-select the Luminosity layer



Increase color saturation

- One pass using Layered Saturation may be insufficient
- Repeat but use a **Screen** Layer

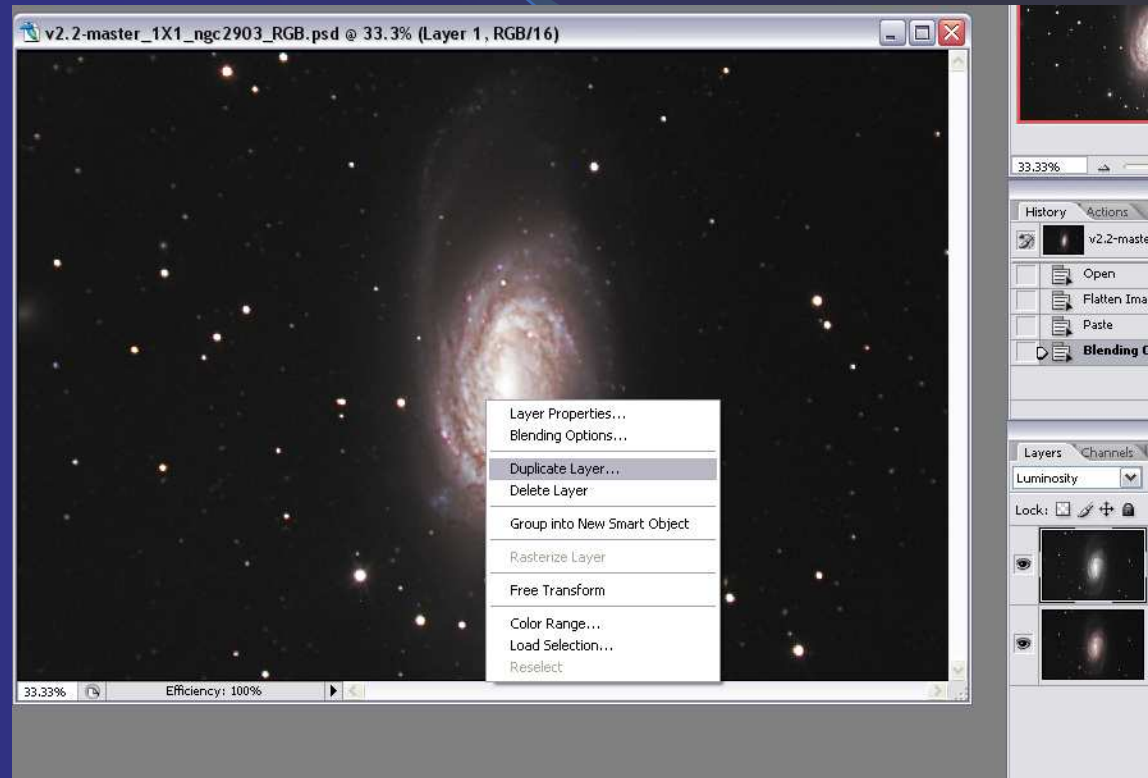
Increase color saturation

Method 1: Layered saturation (second pass)

1. De-select Luminosity layer (top layer)
2. Select Background layer (bottom layer)
3. Right mouse-click on image and select duplicate layer
4. Repeat duplicate layer

This results in four layers:

1. Layer 1
2. Background copy 2
3. Background copy
4. Background



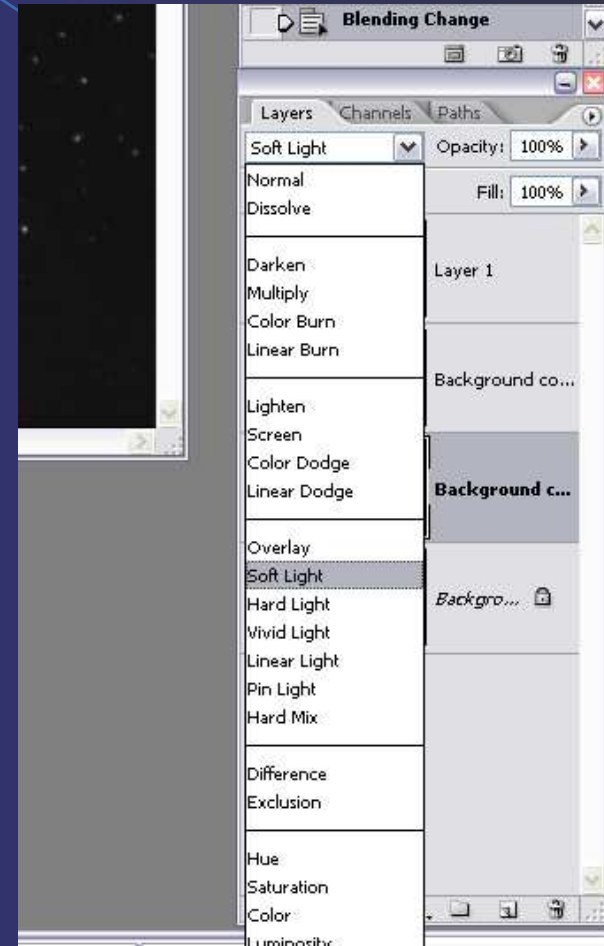
Method 1: Layered saturation (second pass)

-
- The screenshot shows the Photoshop Layers panel. The 'Layers' tab is active. The 'Background' layer is selected, and its blend mode is set to 'Screen'. The opacity is 100%. The 'Fill' property is also set to 100%. The 'Background' layer is currently locked, as indicated by the padlock icon. The 'Background' layer is the only layer visible in the Layers panel.

Increase color saturation

Method 1: Layered saturation (second pass)

1. Select Background copy layer
2. Change property to Soft Light



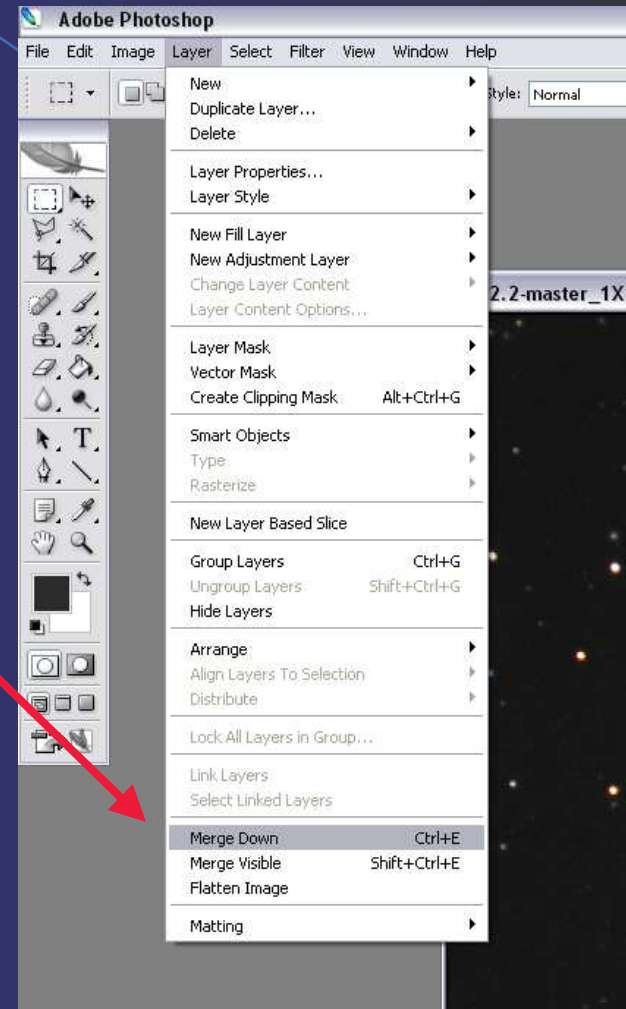
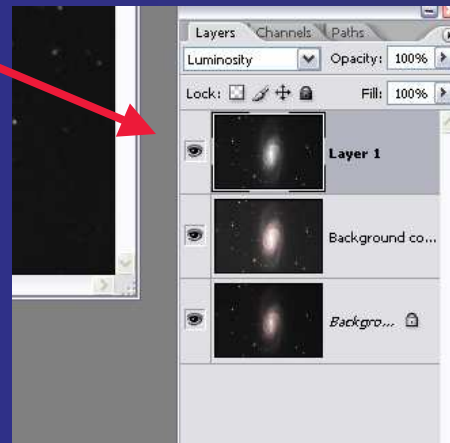
Increase color saturation

Method 1: Layered saturation (second pass)

1. Select Background copy 2 layer
2. **Merge Down** Background copy 2 layer onto Background copy layer

The image will appear dark, so...

3. Re-select the Luminosity layer



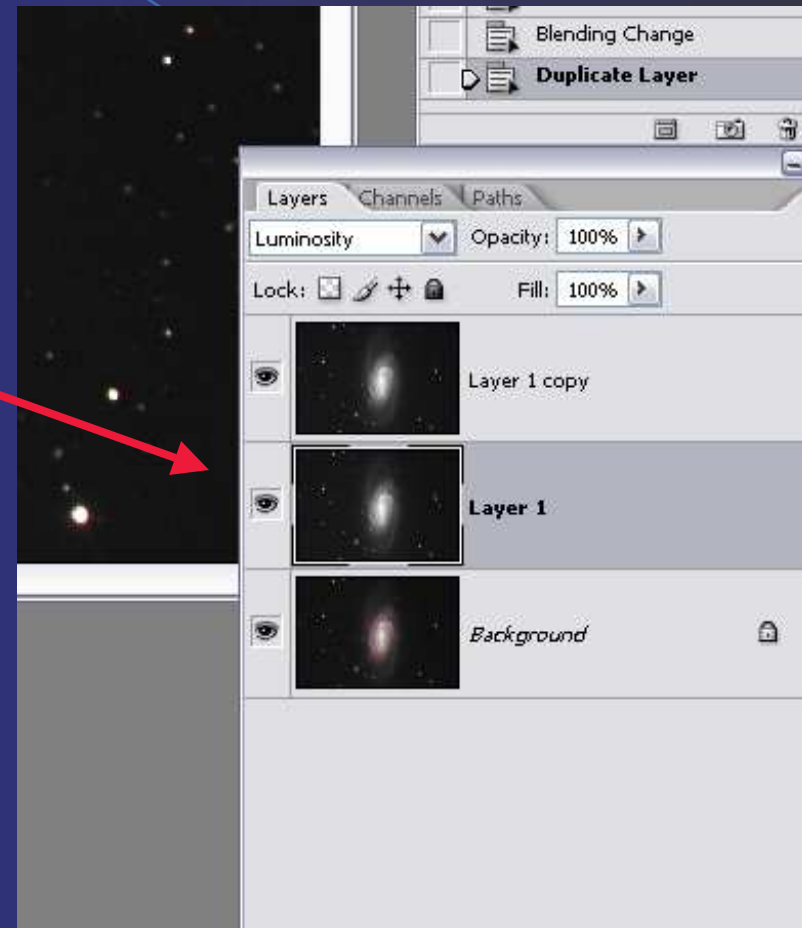
Increase color saturation

- If additional saturation is needed, repeat but use a **Luminosity** Layer as in the first pass
 - Alternate passes using luminosity and screen layers
- A second technique can also be applied:
blurred saturation layering
 - recommended by Robert Gendler
- A third technique can be useful:
Shadow/Highlight tool
 - recommended by Adam Block

Increase color saturation

Method 2: Blurred saturation layering

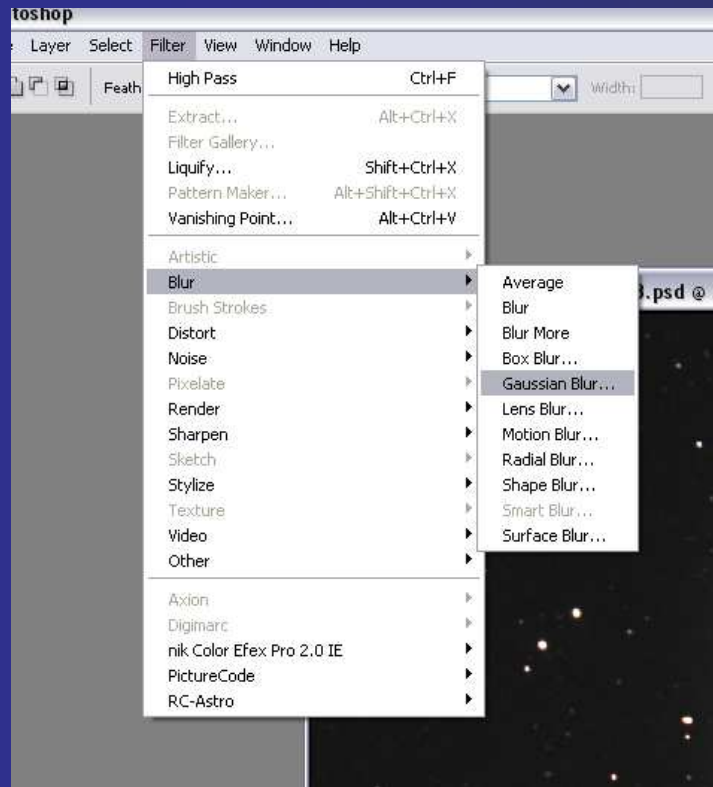
1. Select Luminosity layer (upper layer) and duplicate
2. Select Layer 1 (the new middle layer)



Increase color saturation

Method 2: Blurred saturation layering

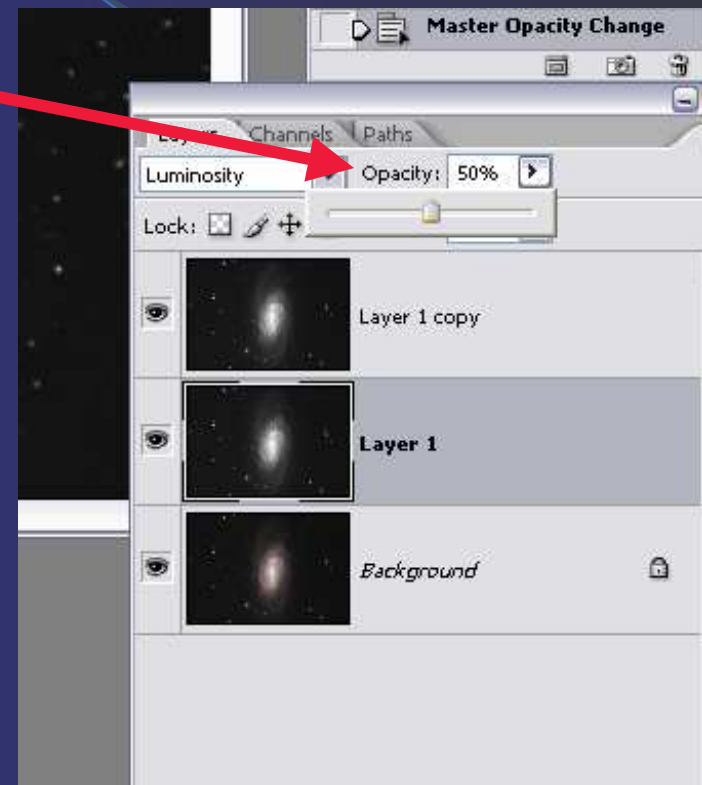
1. Select Gaussian Blur tool
2. Set Gaussian Blur tool between .5 and 1.0



Increase color saturation

Method 2: Blurred saturation layering

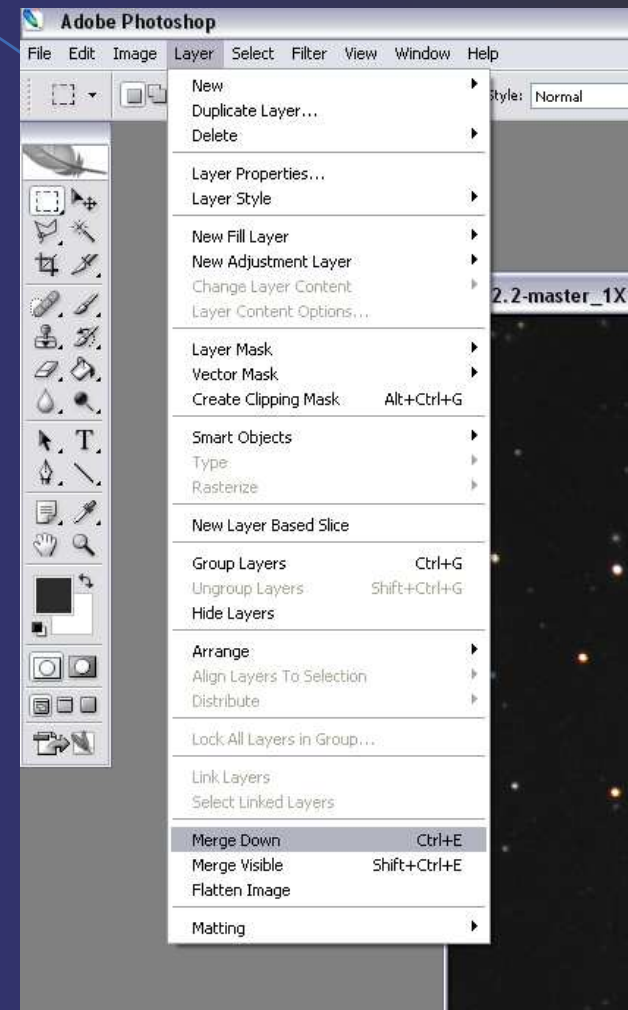
1. Change Opacity of Layer 1 to 50%



Increase color saturation

Method 2: Blurred saturation layering

1. Merge Down Layer 1 onto Background Layer



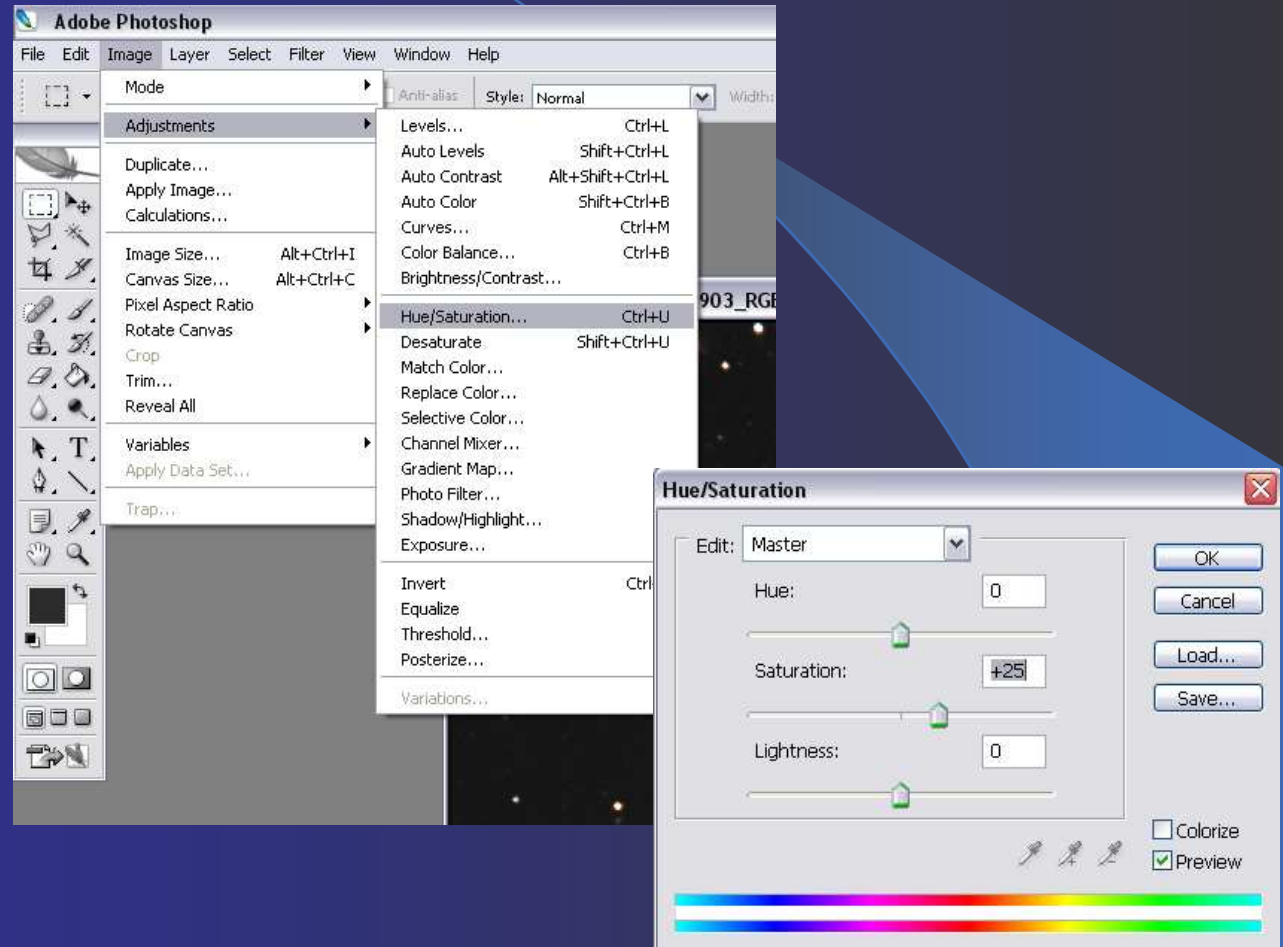
Increase color saturation

Method 2: Blurred saturation layering

1. Select Saturation tool
2. Set tool to between 15 and 35 based on the quality of the color data.

Setting the saturation tool too high will introduce **color noise**

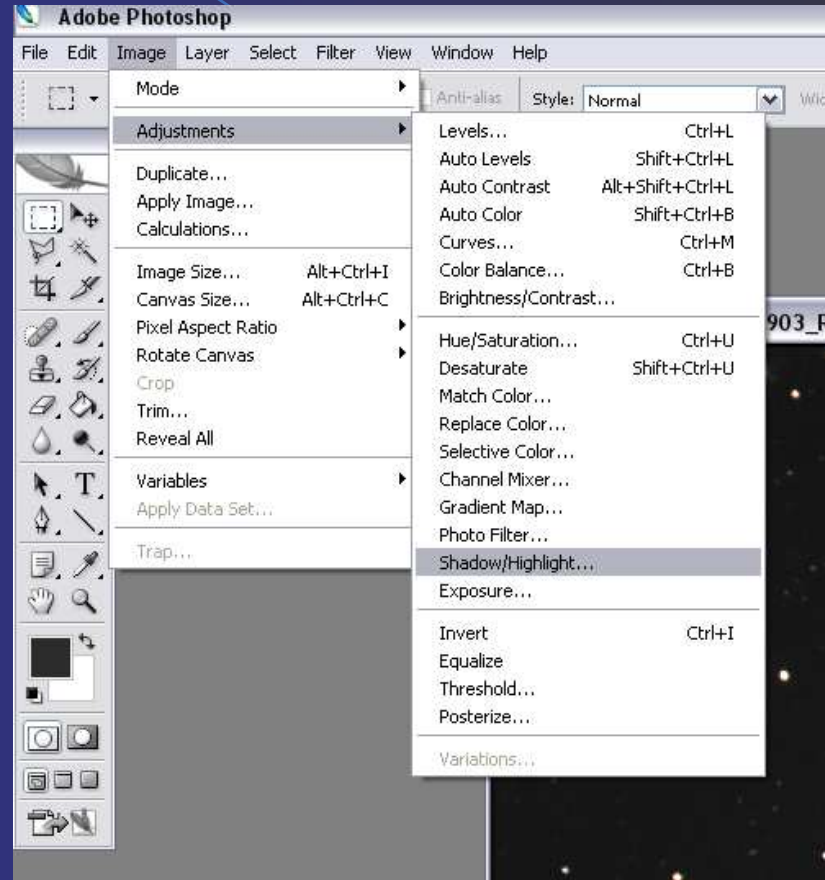
3. Re-select the Luminosity layer (top layer) to view the result



Increase color saturation

Method 3: Shadow/Highlight tool

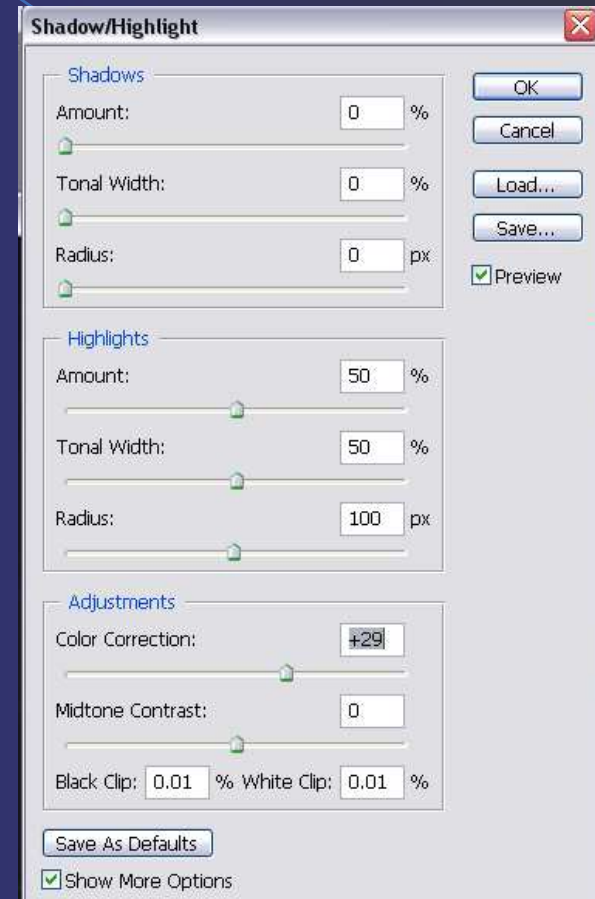
1. Select Background Layer and copy
2. Select Background copy layer
3. Select Shadow/Highlight tool



Increase color saturation

Method 3: Shadow/Highlight tool

1. Set Shadows Amount, Tonal Width and Radius to zero percent
2. Set Highlights Amount and Tonal width to 50% and Radius to 100 px
3. Set Adjustments Midtone Contrast to zero
4. Set color Correction to a positive number
 - Avoid high Correction values to avoid adding **color noise**.
 - Best results are obtained if this method is used when stretching RGB data.



Creating synthetic luminance

- Method 1:
 - Sum combine one set of R, G and B images, smooth slightly and add to your set of clear channel luminance's
 - Repeat until all R,G and B sets have been combined separately
- Method 2:
 - Sum combine all R, G and B images, smooth slightly and add to your set of clear channel luminance's
- Combine synthetic luminance with clear channel luminance

Layered Contrast Stretching

- Reveals subtle details based on small variances in contrast
- Reveals darker and lighter features
- Reveals features hidden in color data
- Can be used to sharpen or soften data



M-94 NM



M-94 NM



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M-94 NM & SST



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M-94 NM & SST

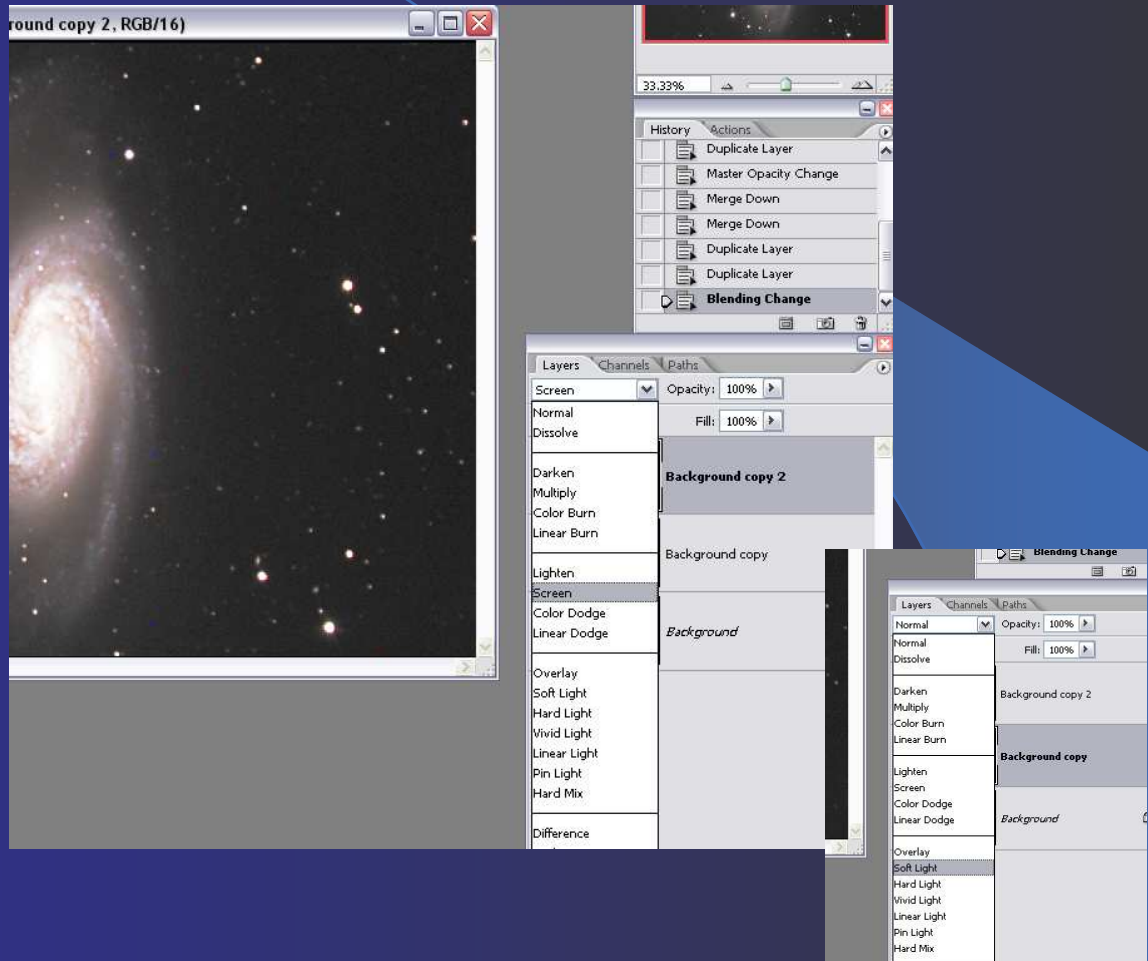


Reproduction prohibited

M-94 NM & SST

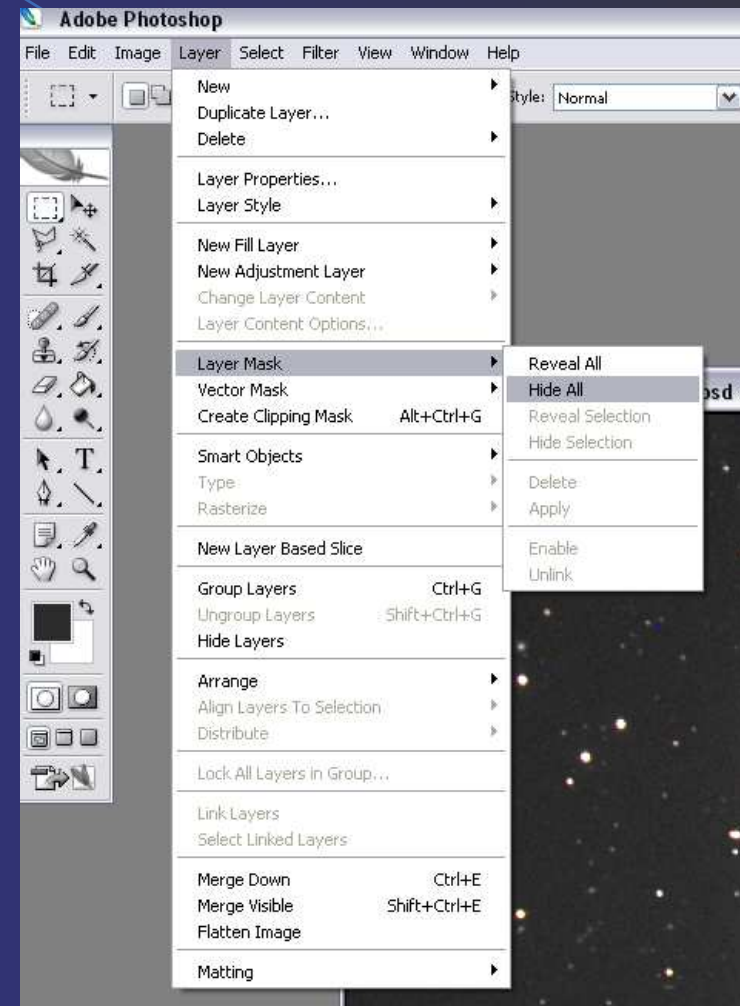
Layered Contrast Stretching

1. Duplicate background layer twice
2. Change Background copy 2 layer (upper layer) property to **Screen**
3. Change Background copy layer (middle layer) to **Soft Light**



Layered Contrast Stretching

1. Select each of the copied layers and add a Layer Mask set to **Hide All**



Layered Contrast Stretching

1. Set the foreground color picker to white
2. Select the paintbrush tool

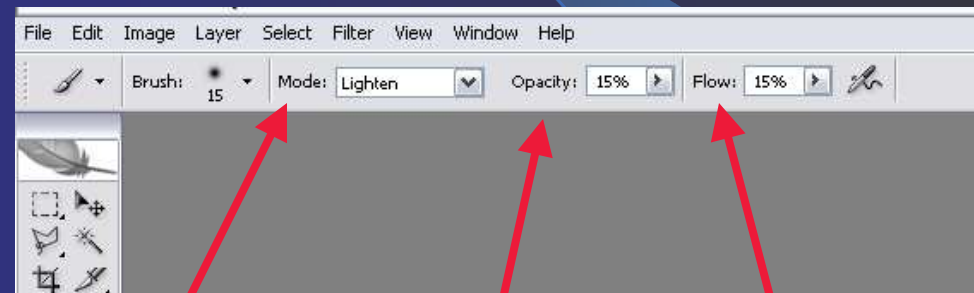
Foreground color picker

Paintbrush tool



Layered Contrast Stretching

1. Set the paintbrush Mode to Lighten
2. Set the paintbrush Opacity and Flow to 15% or some other low percentage



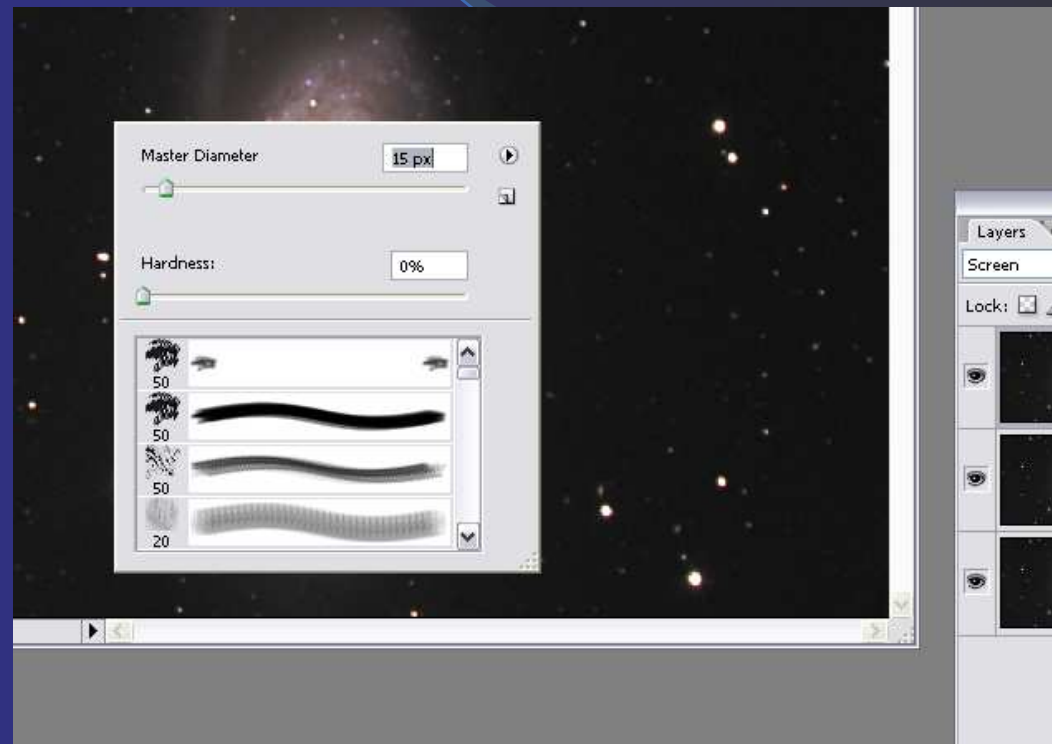
Paintbrush Mode

Paintbrush Opacity

Paintbrush Flow

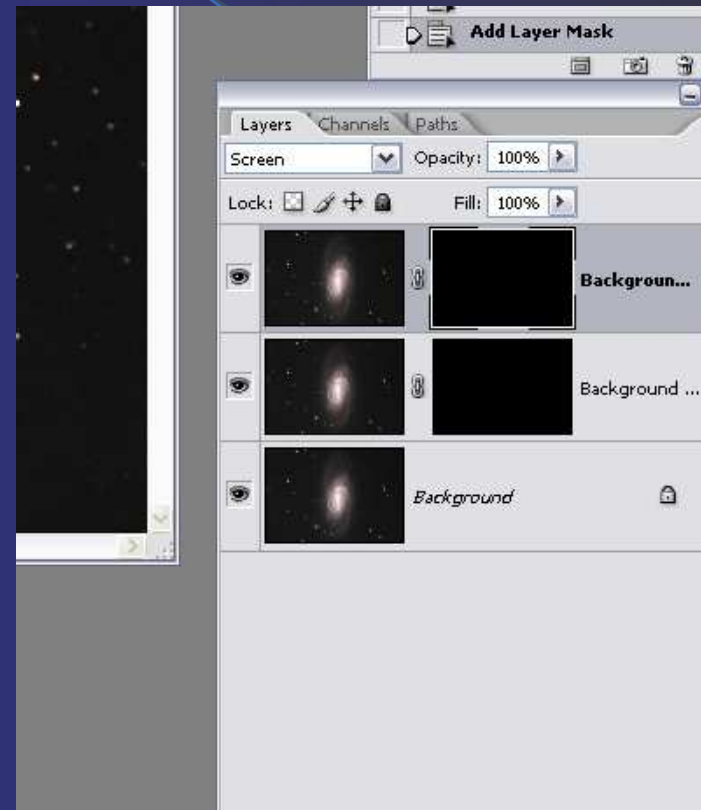
Layered Contrast Stretching

1. Select the image and right mouse-click to open the paintbrush preference tool
2. Select a small diameter brush, zero hardness and soft airbrush behavior



Layered Contrast Stretching

1. Click on a Layer mask then on the image and begin painting
 - Selecting the Screen layer will reveal hidden highlights
 - Selecting the Soft Light layer will reveal details



Leveraging Layered Contrast Stretching

- Contrast layers can be produced by increasing or decreasing:
 - brightness
 - contrast
 - color saturation
 - sharpness
- Contrast layers can be used to sharpen or soften
 - Small brushes sharpen (4-10 pixels)
 - Large brushes soften (20-30 pixels)

Leveraging Layered Contrast Stretching

- Stack a Screen layer over a Soft Light layer and work both simultaneously



NGC 5907



NGC 5907



NGC 5907

Space is a place

It's easy to get caught up in the technical aspects of our hobby- the telescope, the mount, the processing and the camera.

But we are not just technicians and we are not just artists. We are engaged in the tourism business and our vacation spots are M33, the Andromeda Galaxy and all points in between and beyond.

Each one of our pictures is a portal- transportation takes only a glance from the viewer. Space is a place- and we produce the post cards.

Wishing I was there....



NGC 1097



NGC 1097