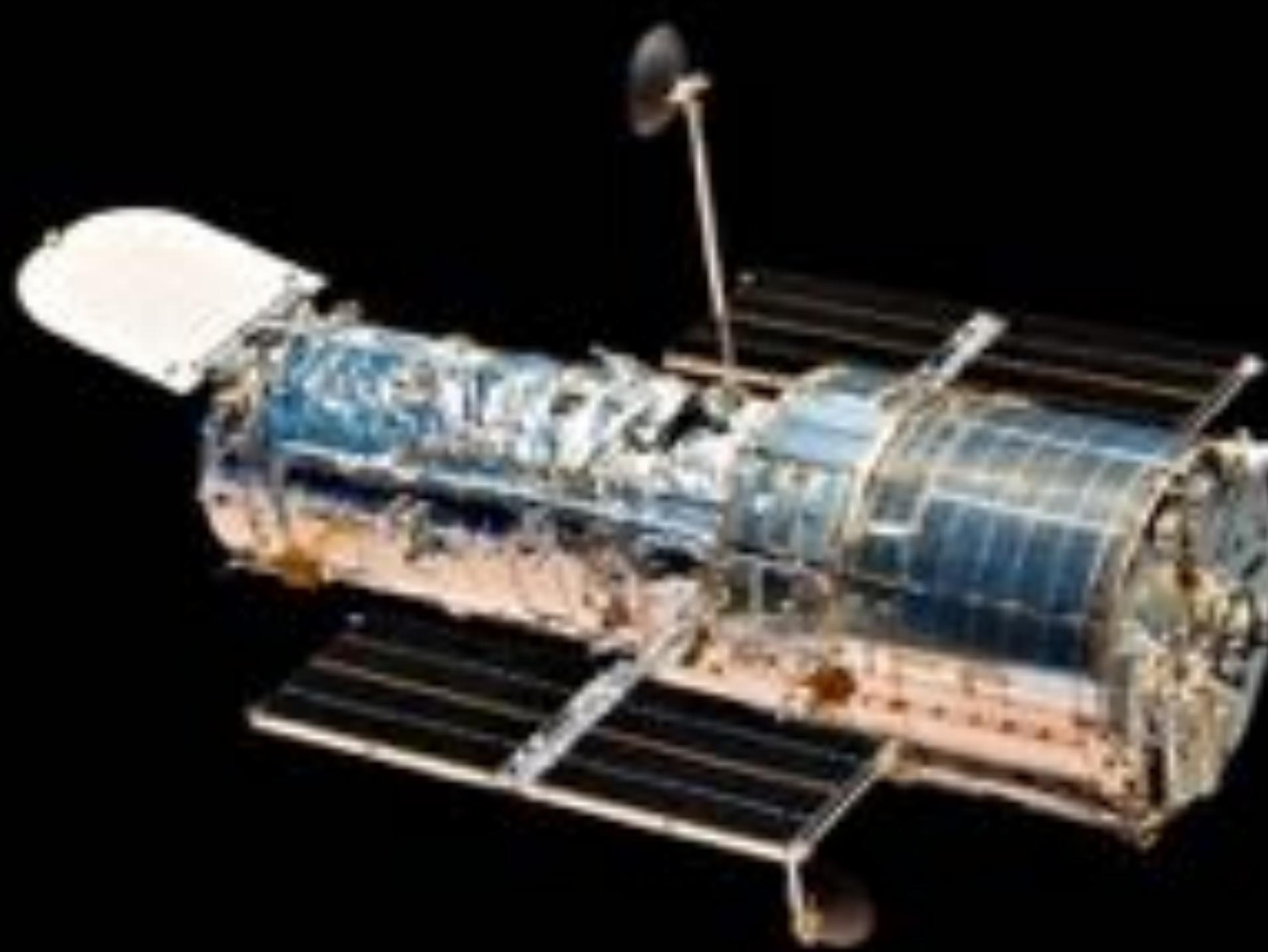


Preparing *HST* Images for Outreach

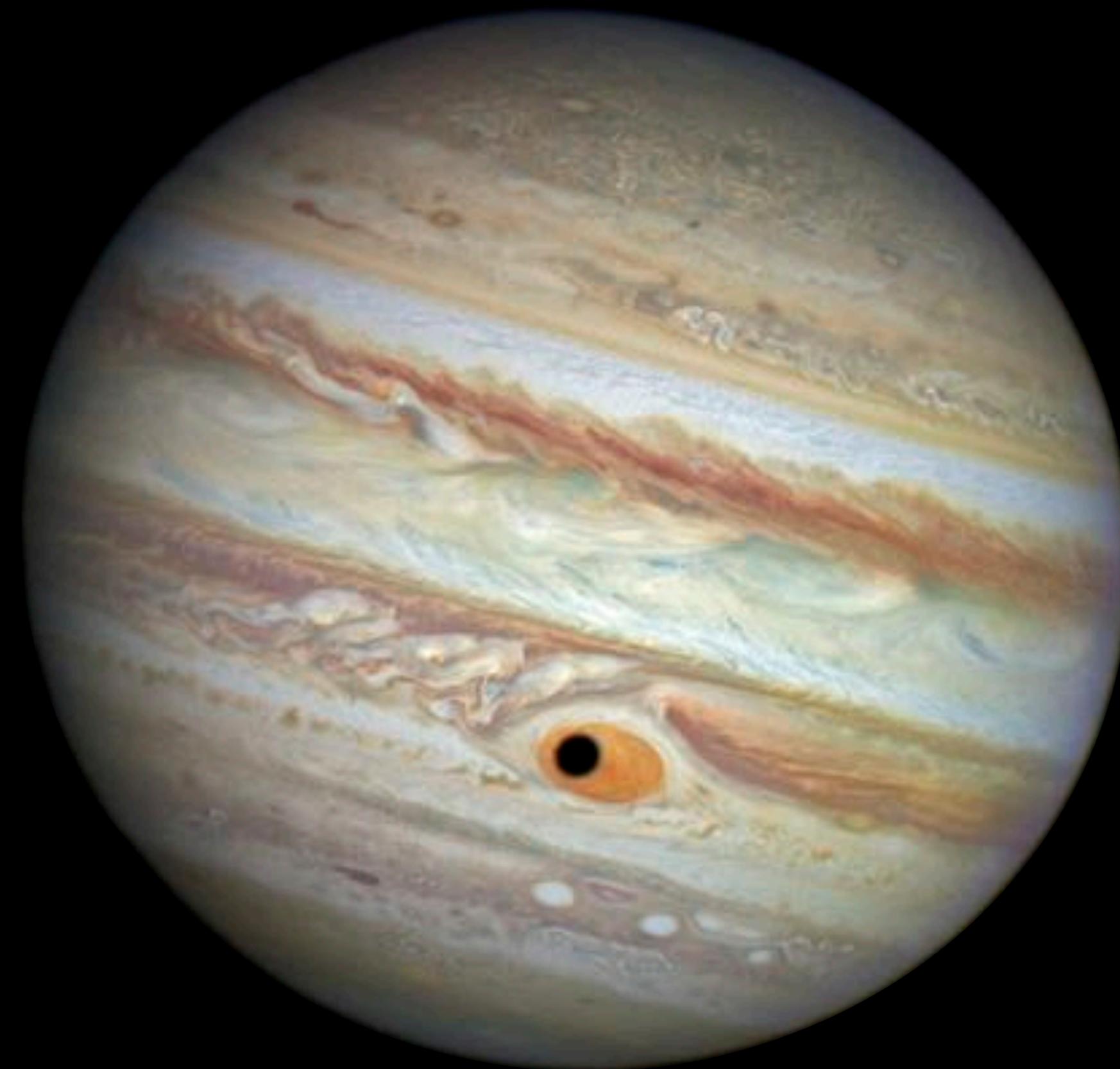
Zoltan Levay
Joseph DePasquale
Space Telescope Science Institute

What we do, and why

- Illustrate science results
- Visualize data
- Engage and educate
- Maximize information content
- Balance aesthetics and science













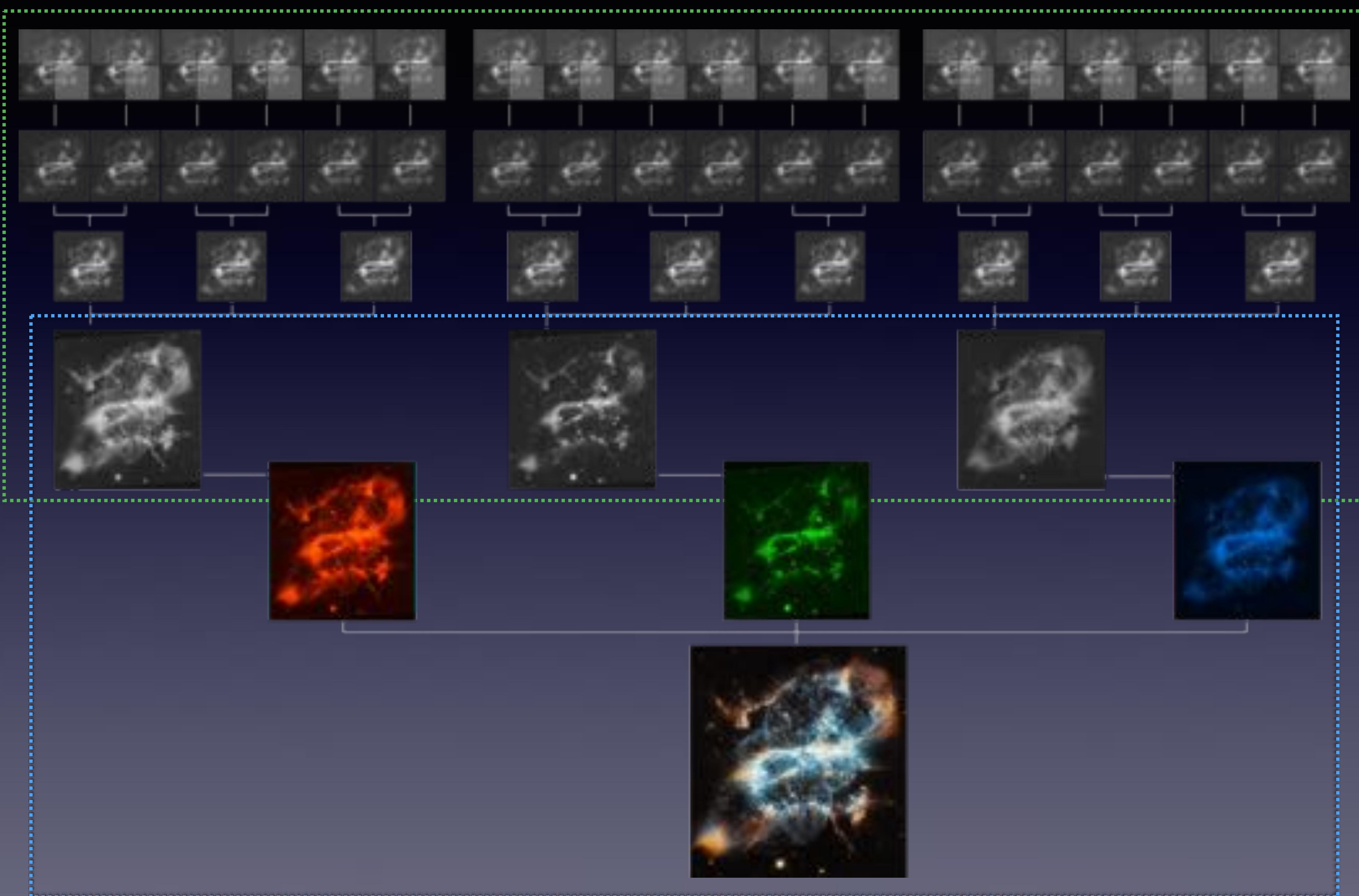












Visual principles

- ♦ Tonality
- ♦ Color
- ♦ Composition

Data to pictures: intensity scaling

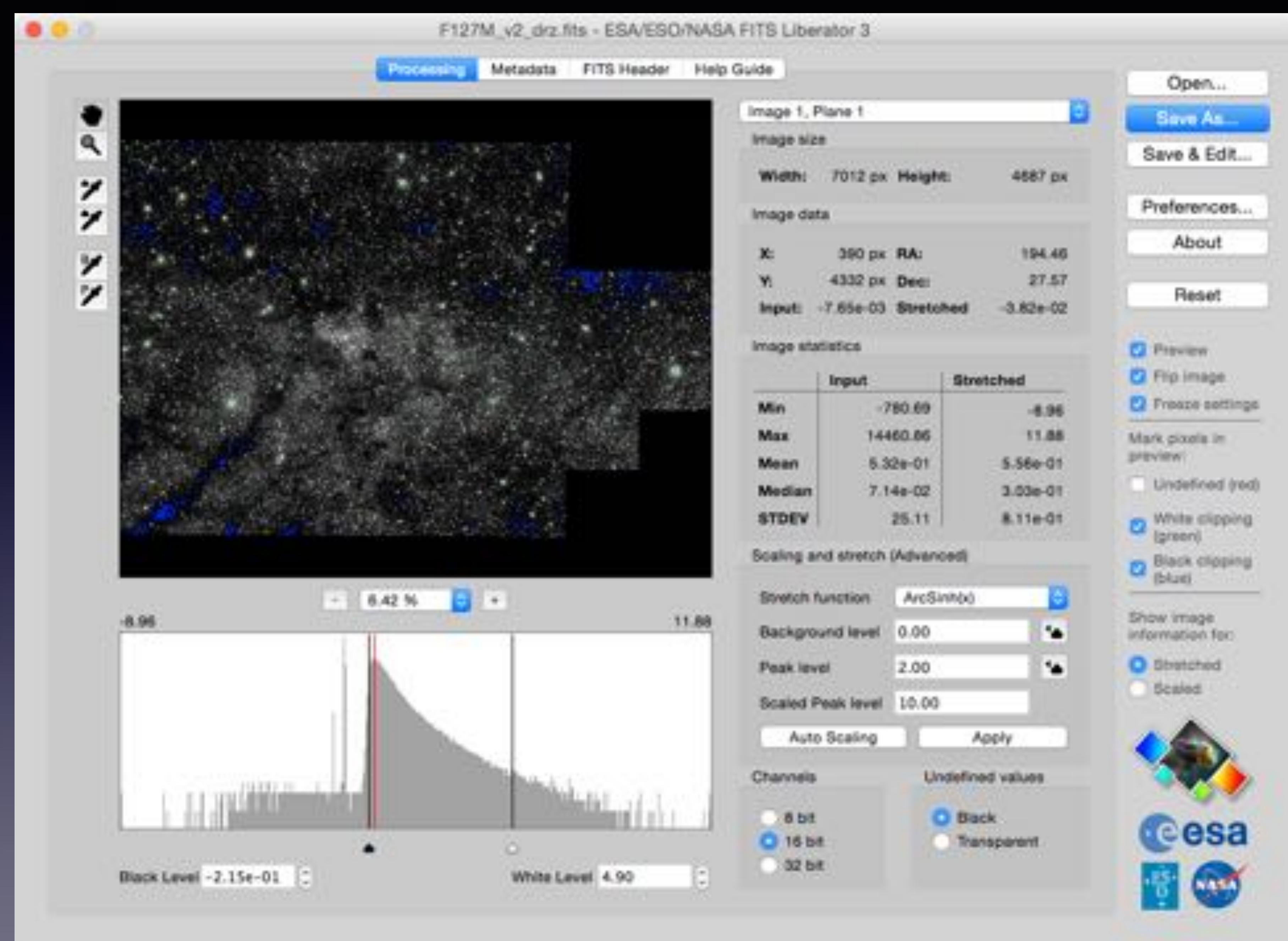
Linear - 'highlights'



Linear - 'shadows'

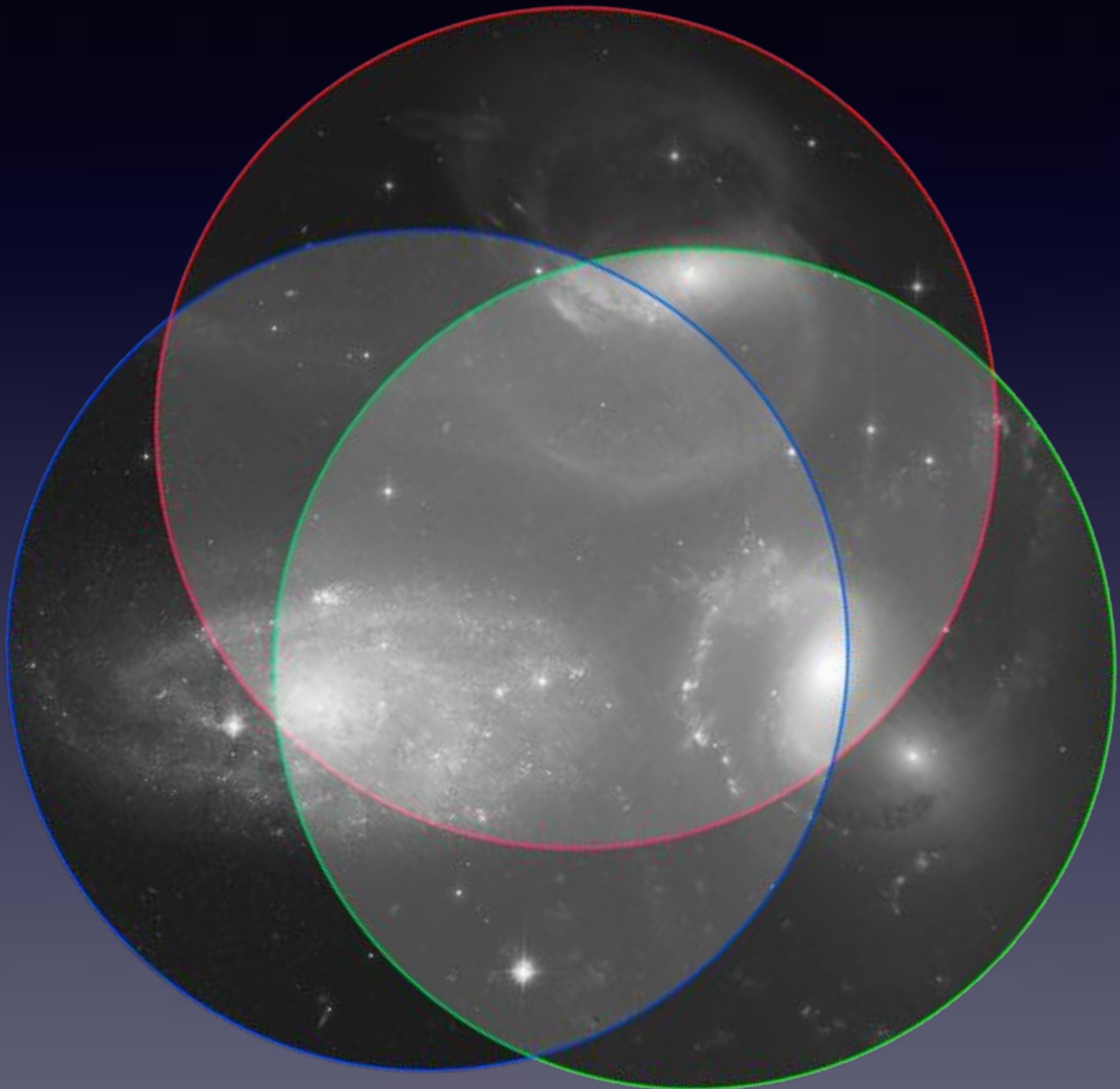
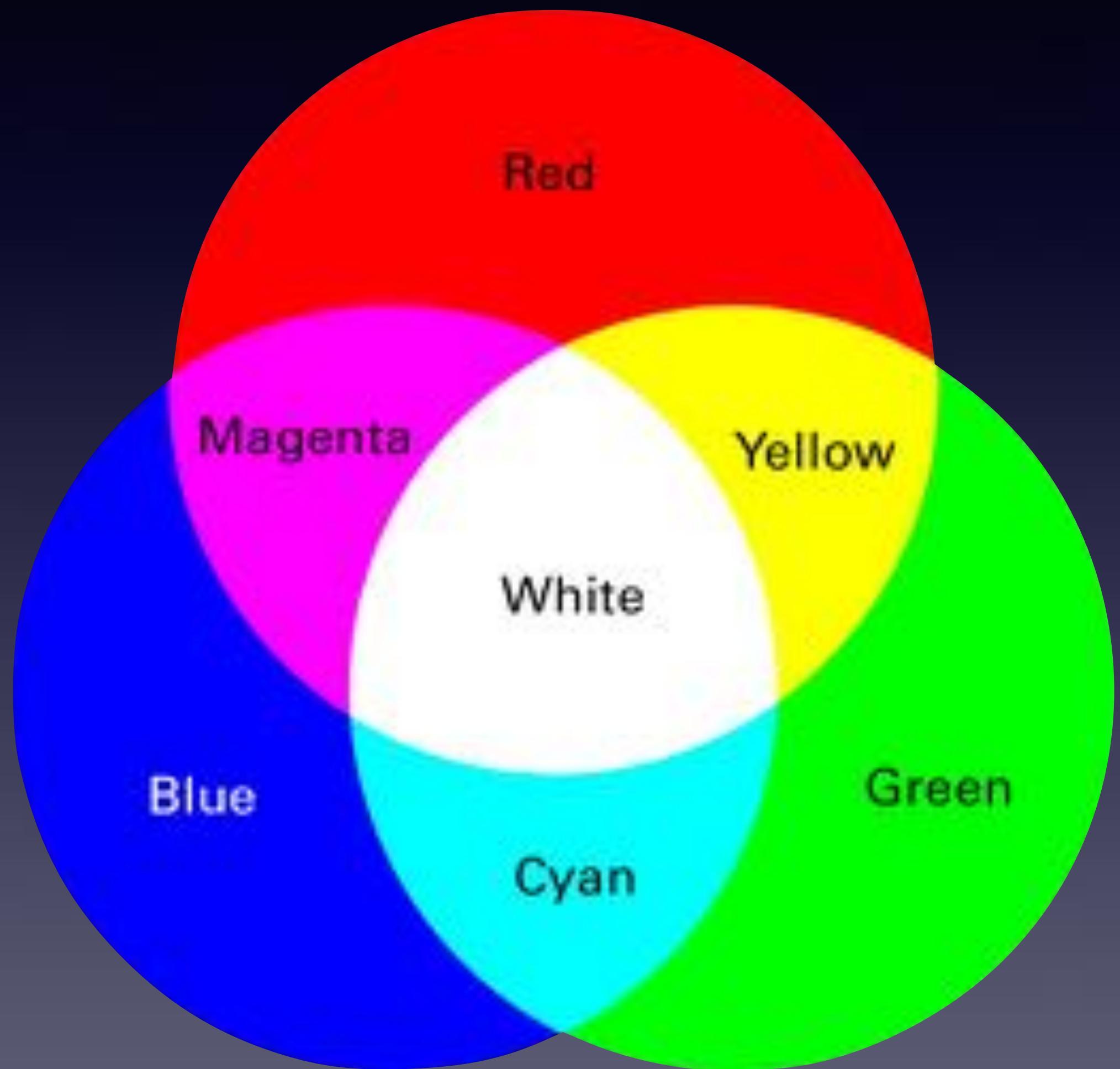


Non-linear (asinh)



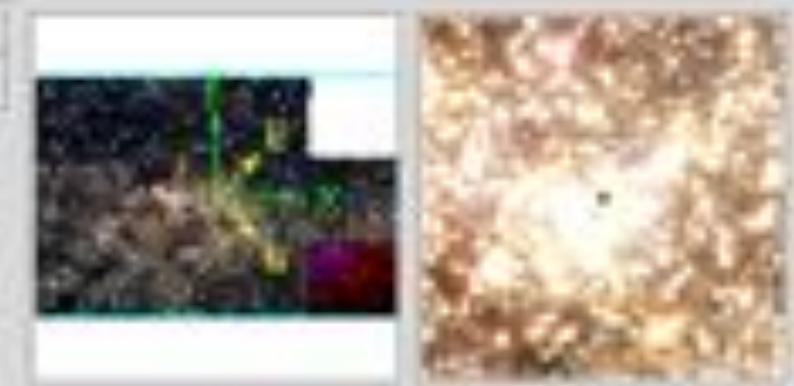
https://www.spacetelescope.org/projects/fits_liberator/

Composite color

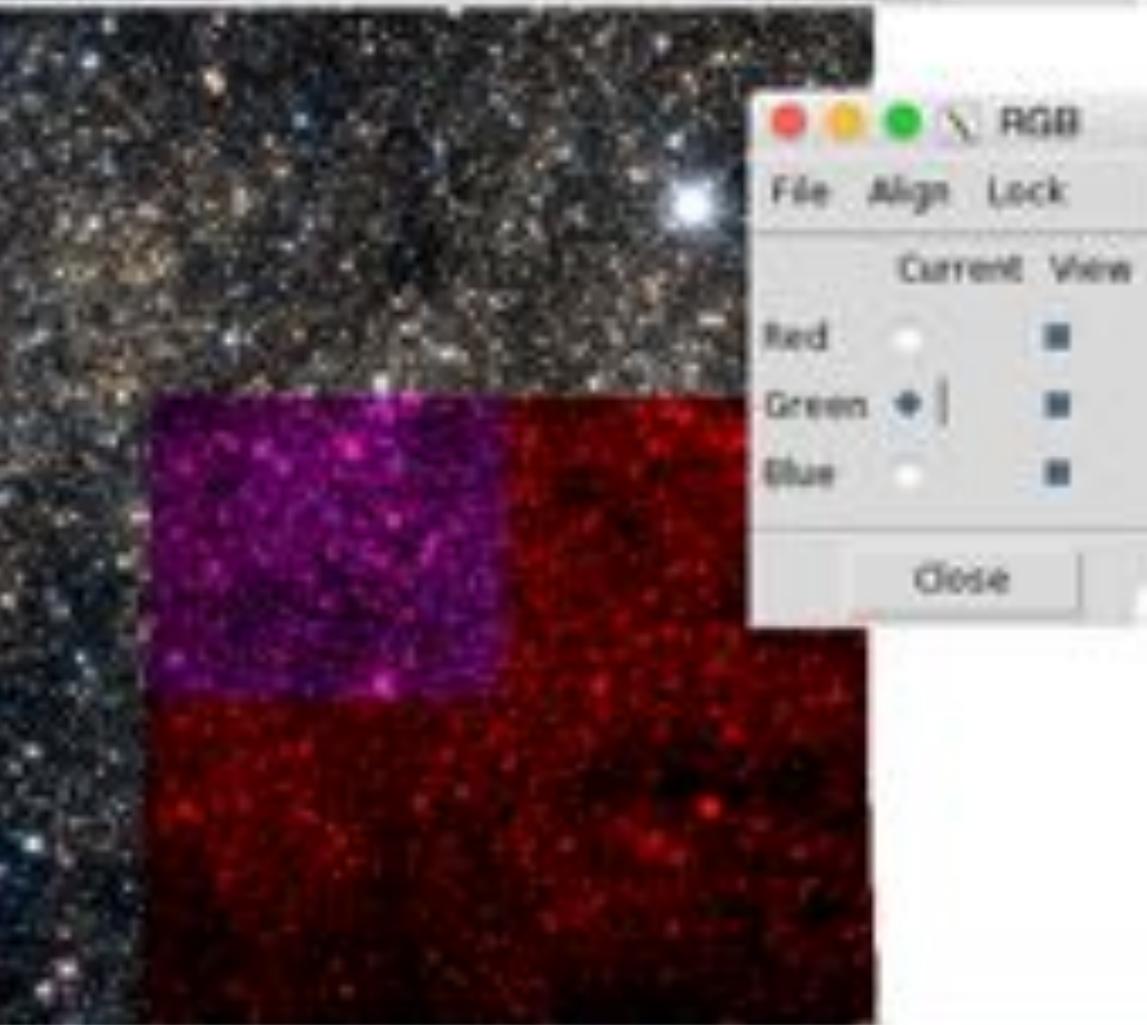
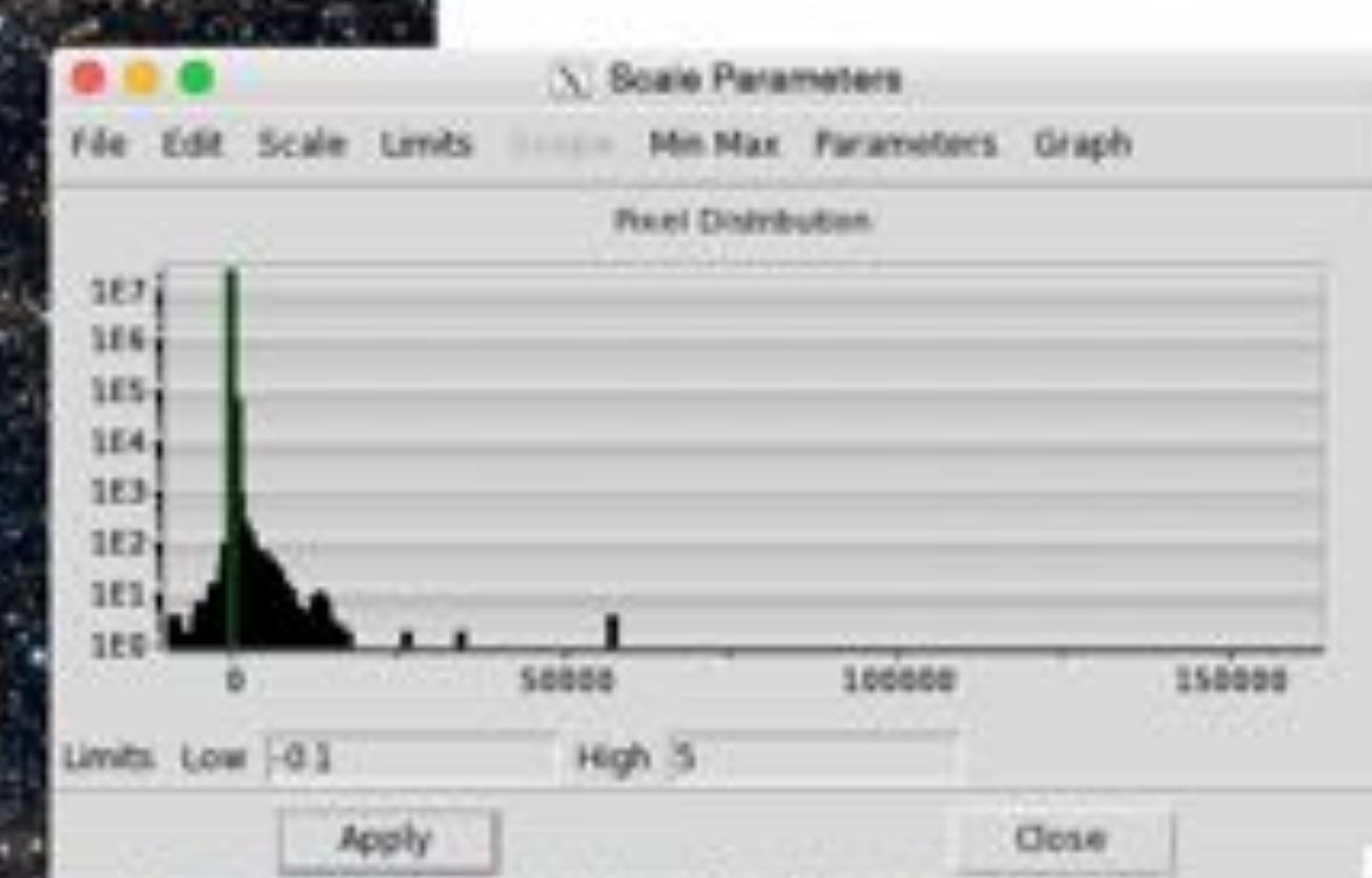


File Edit View Frame Zoom Scale Color Region WCS Analysis Help

File	F139M_v2_dz2.fits(SOI)					
Object						
Value	r	18.3751	g	6.26269	b	2.48363
DRZWCS		17.4540.206		-29.0028.69		
Physical	X	2666.135	Y	2354.087		
Image	X	2666.135	Y	2354.087		
Frame 2	X	0.149	Y	0.000		*



File edit view frame bin zoom scale color region wcs help
- + to fit zoom 1/8 zoom 1/4 zoom 1/2 zoom 1 zoom 2 zoom 4 zoom 8

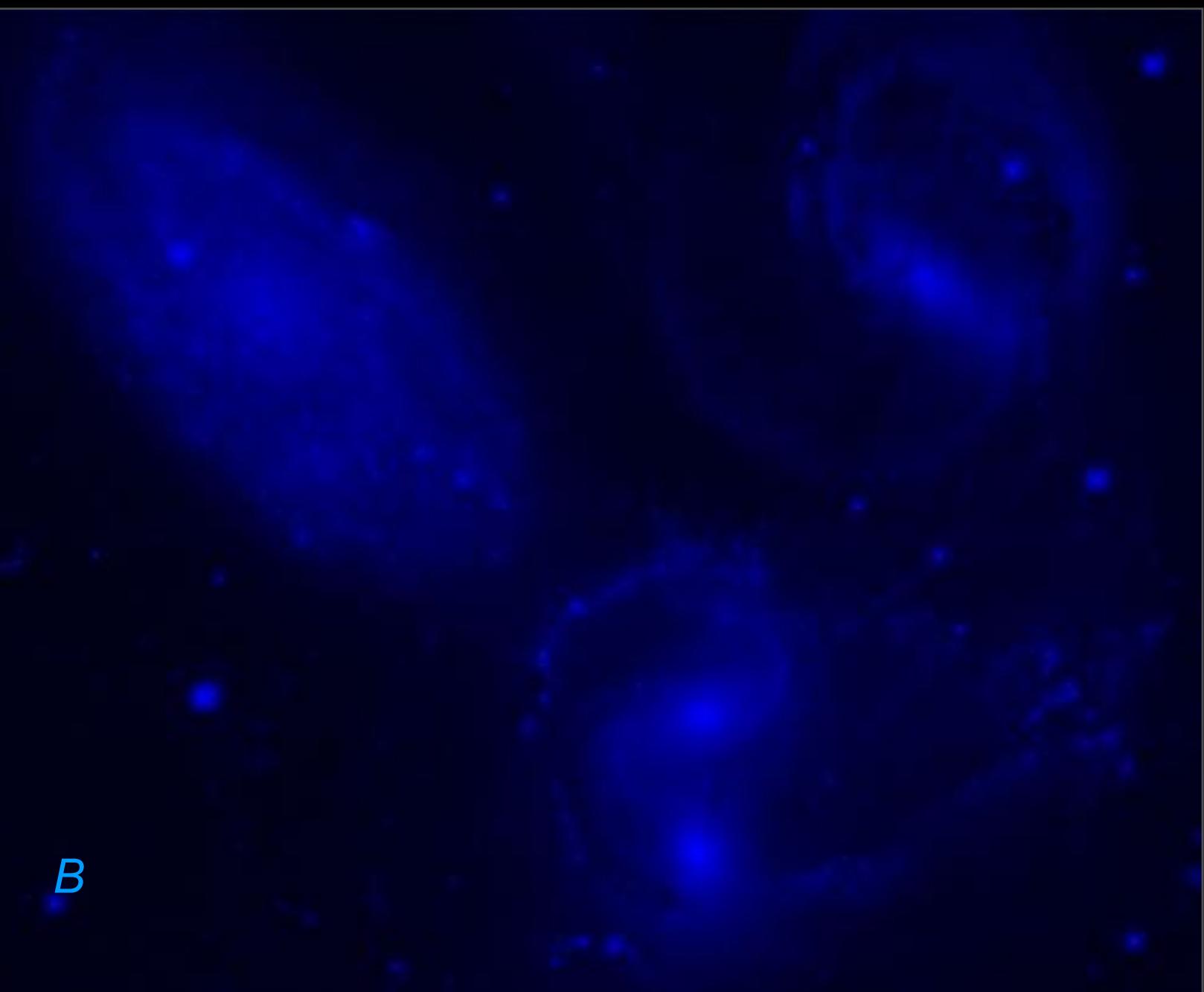
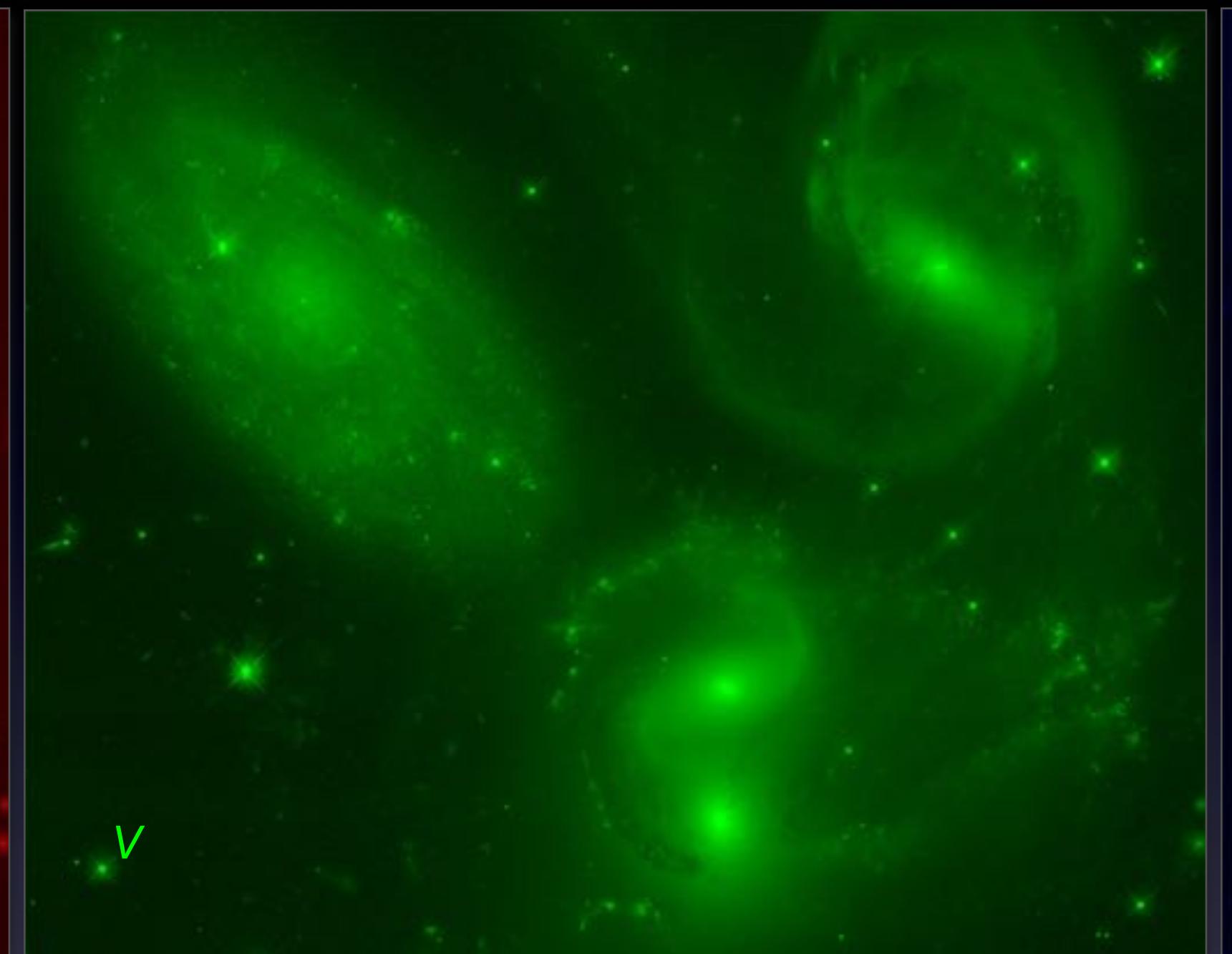
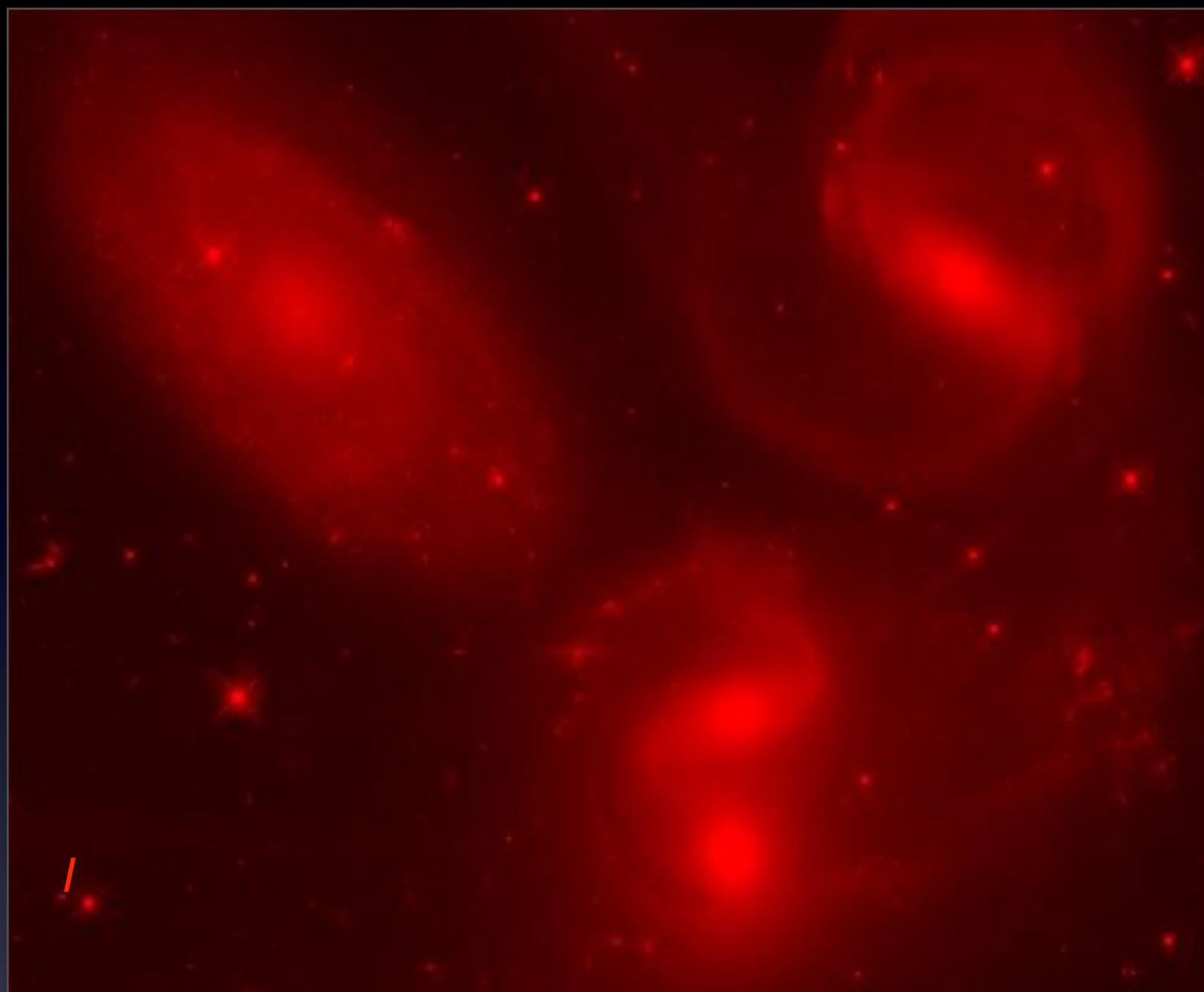


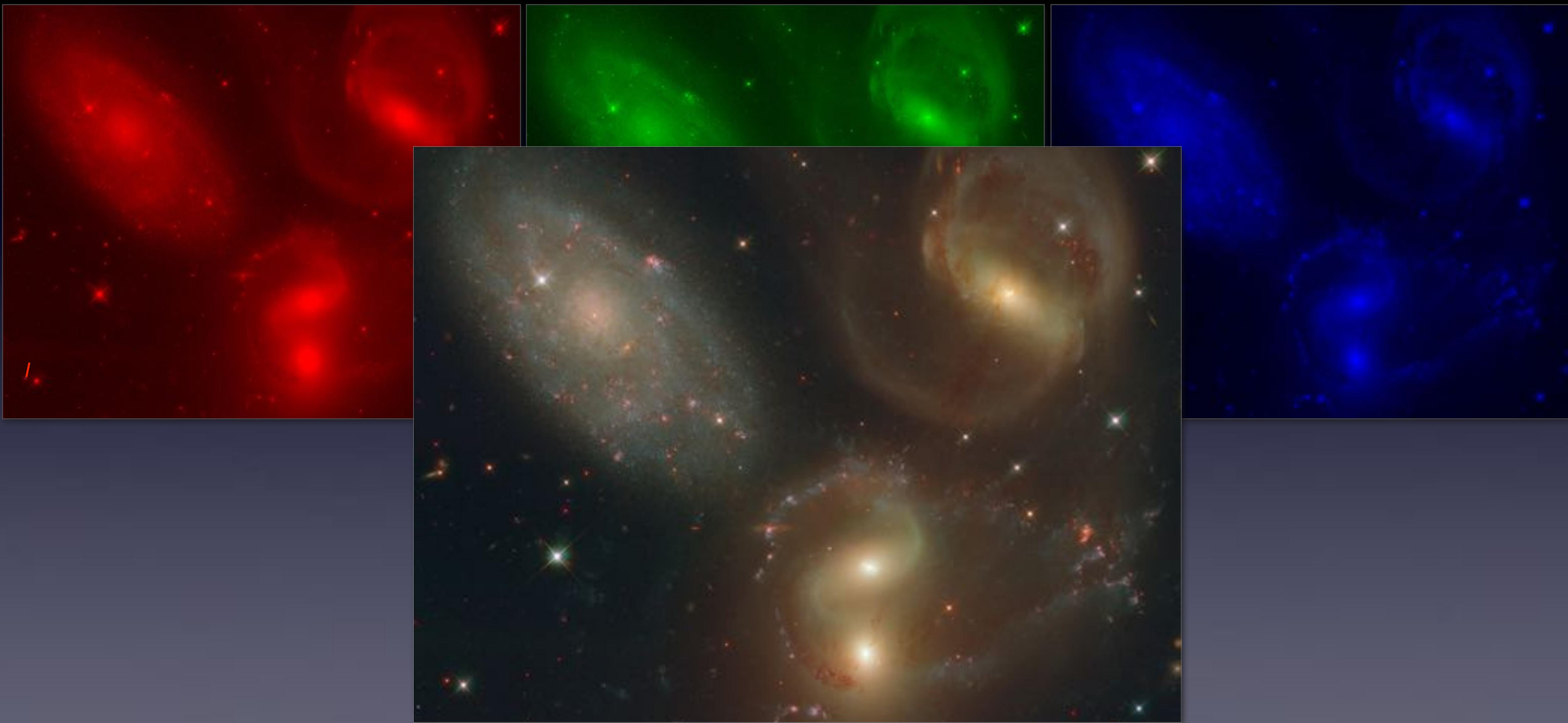
0.055 0.22 0.42 0.67 0.99 1.4 2 2.7 3.7

“Natural” color composite: broad-band filters



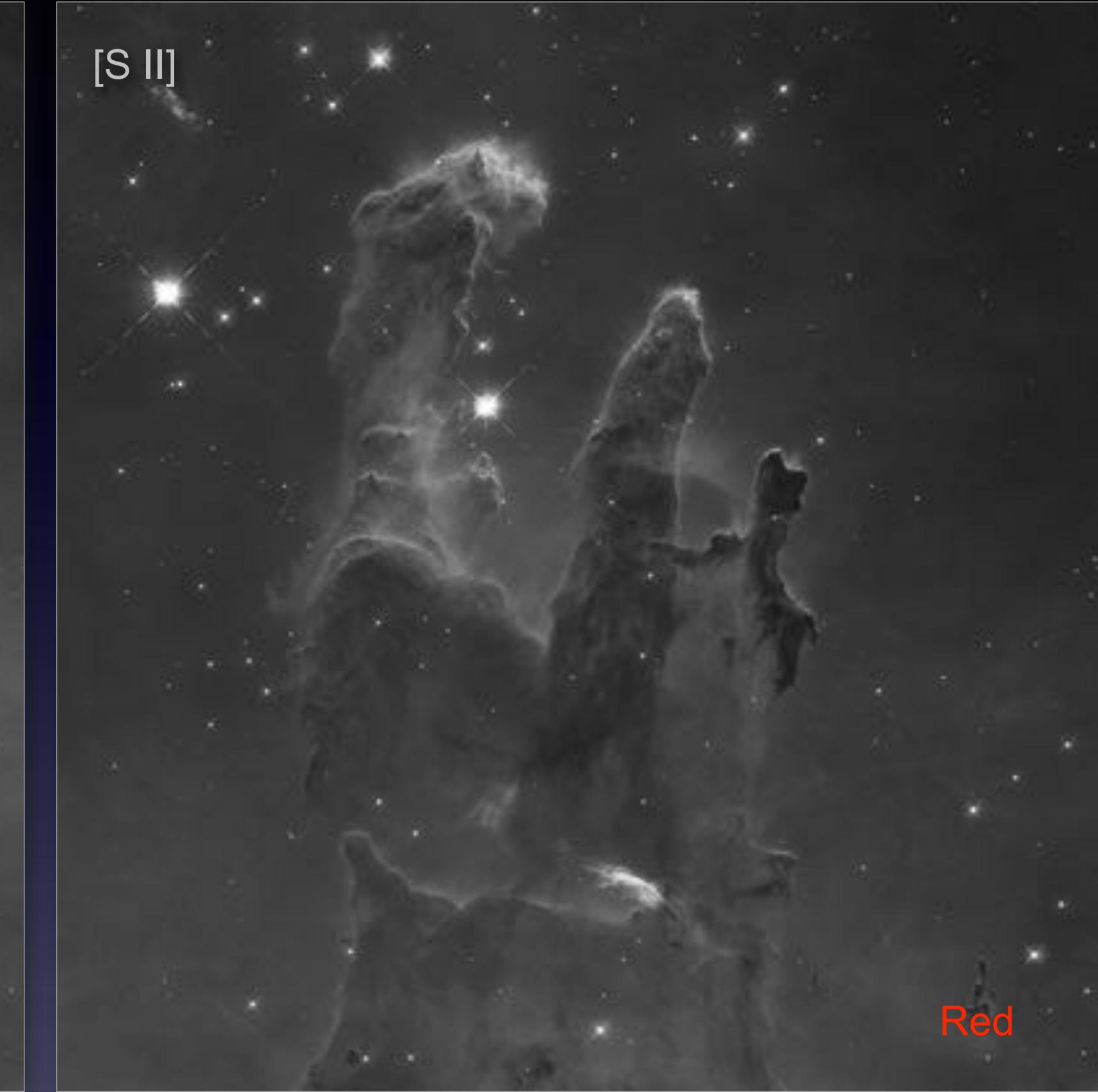
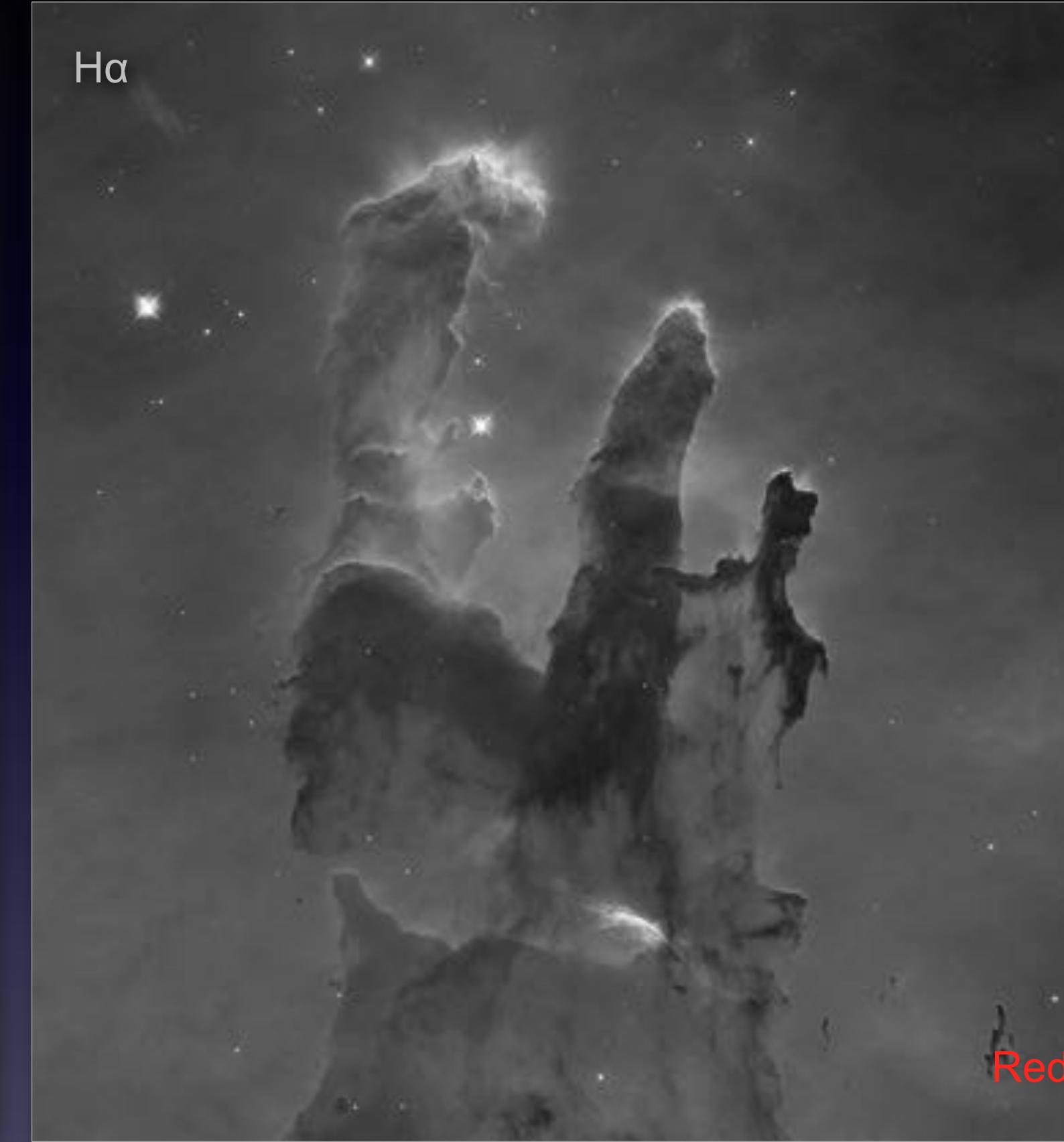
Stephan’s Quintet - *HST* WFC3/UVIS

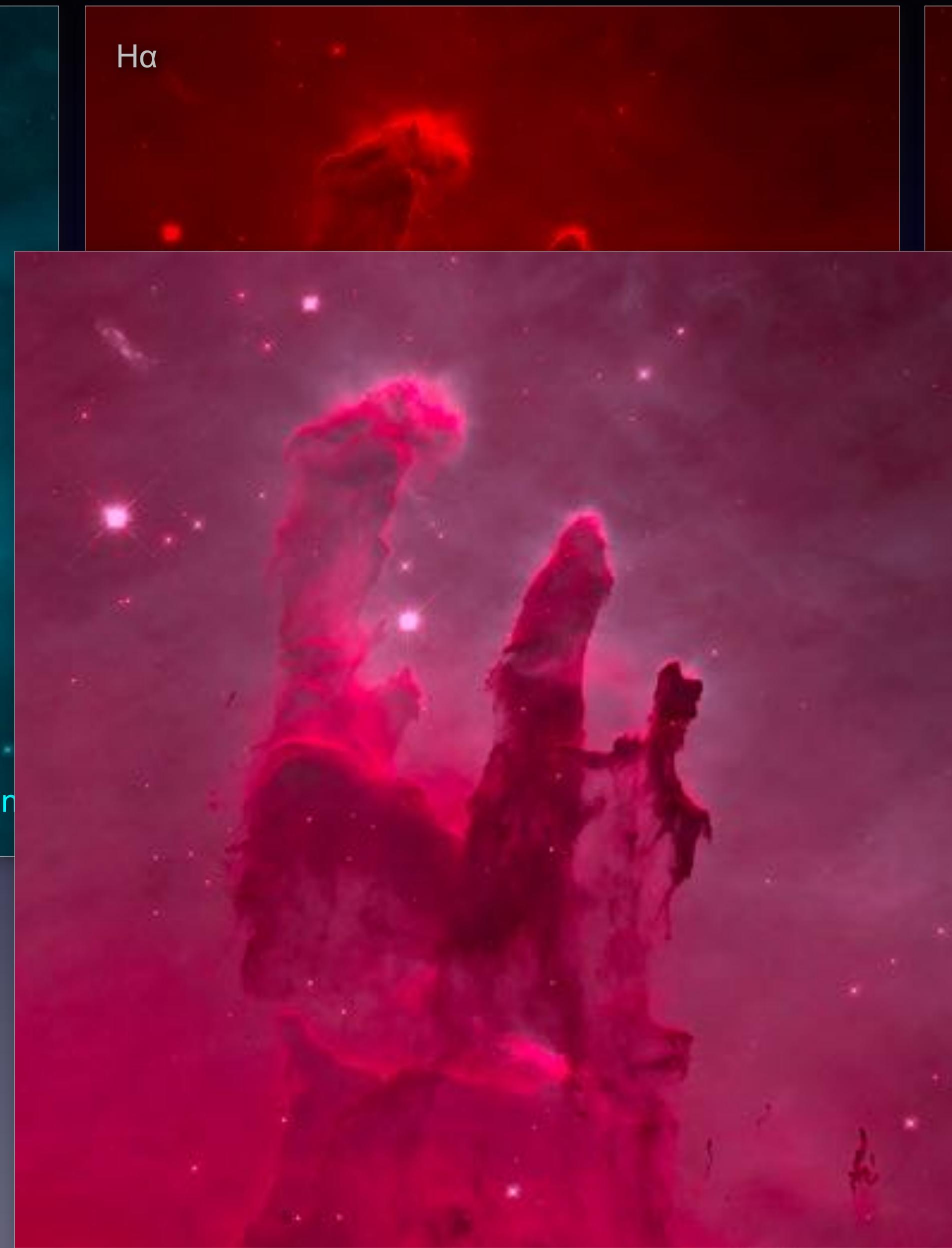


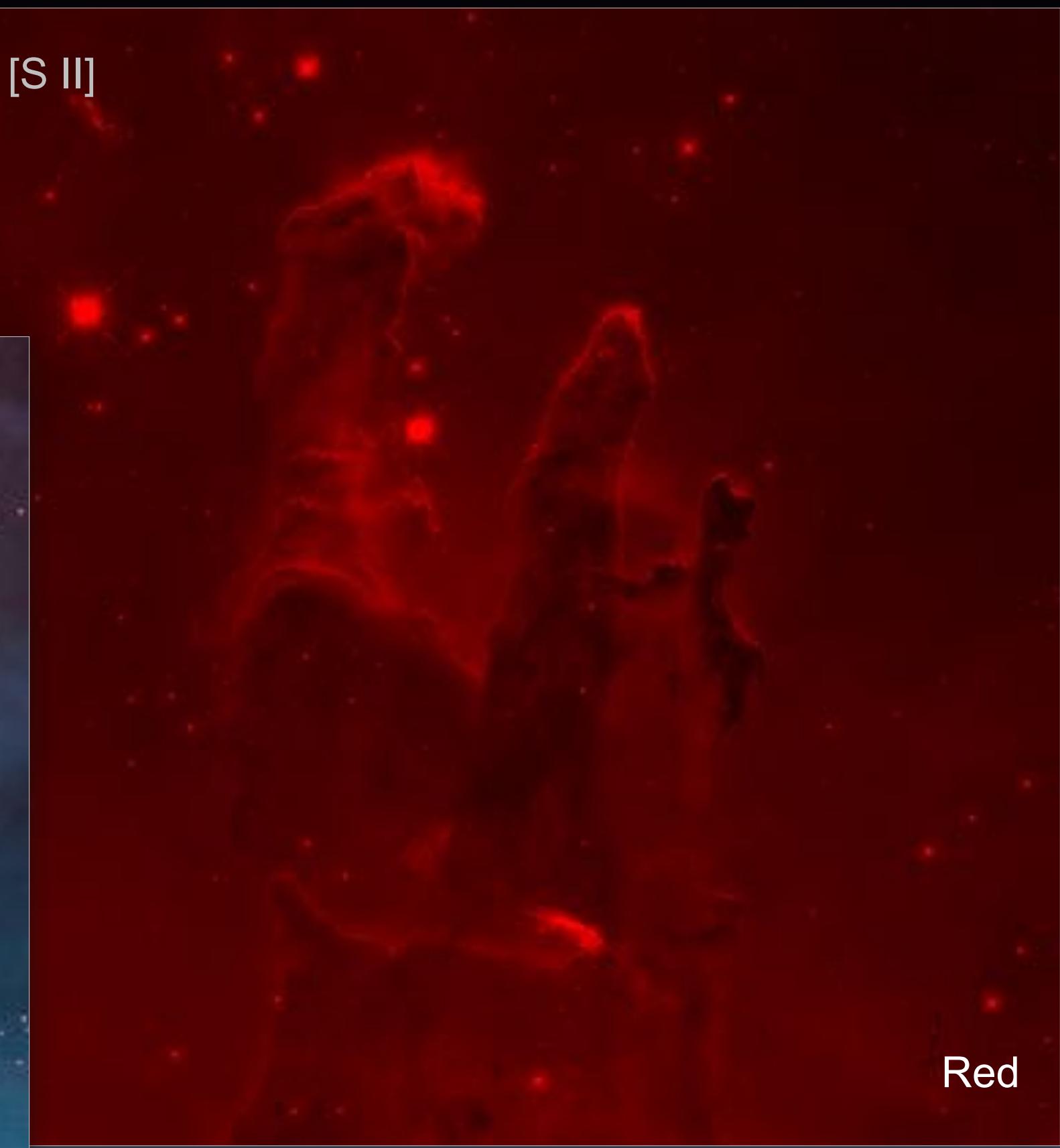
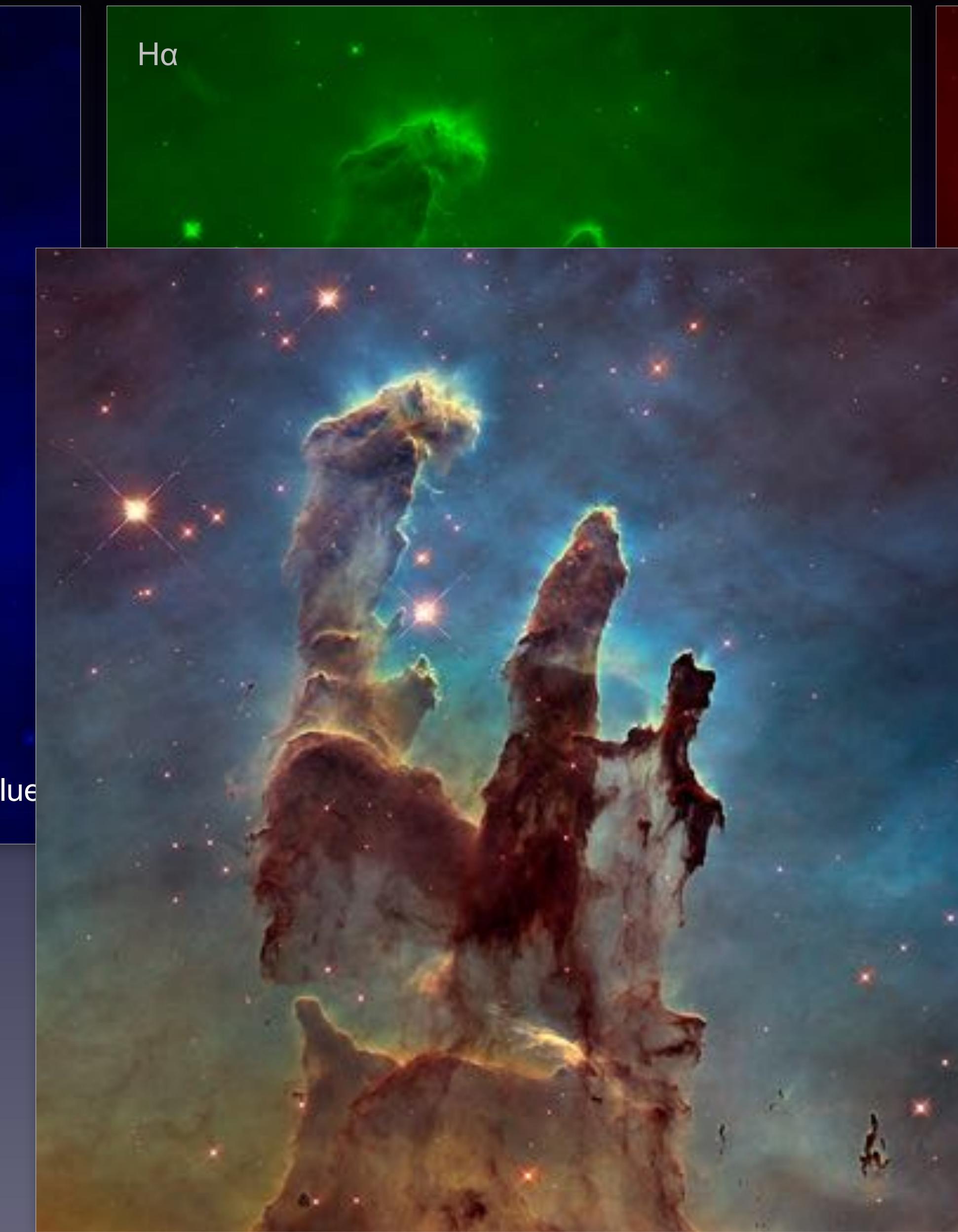


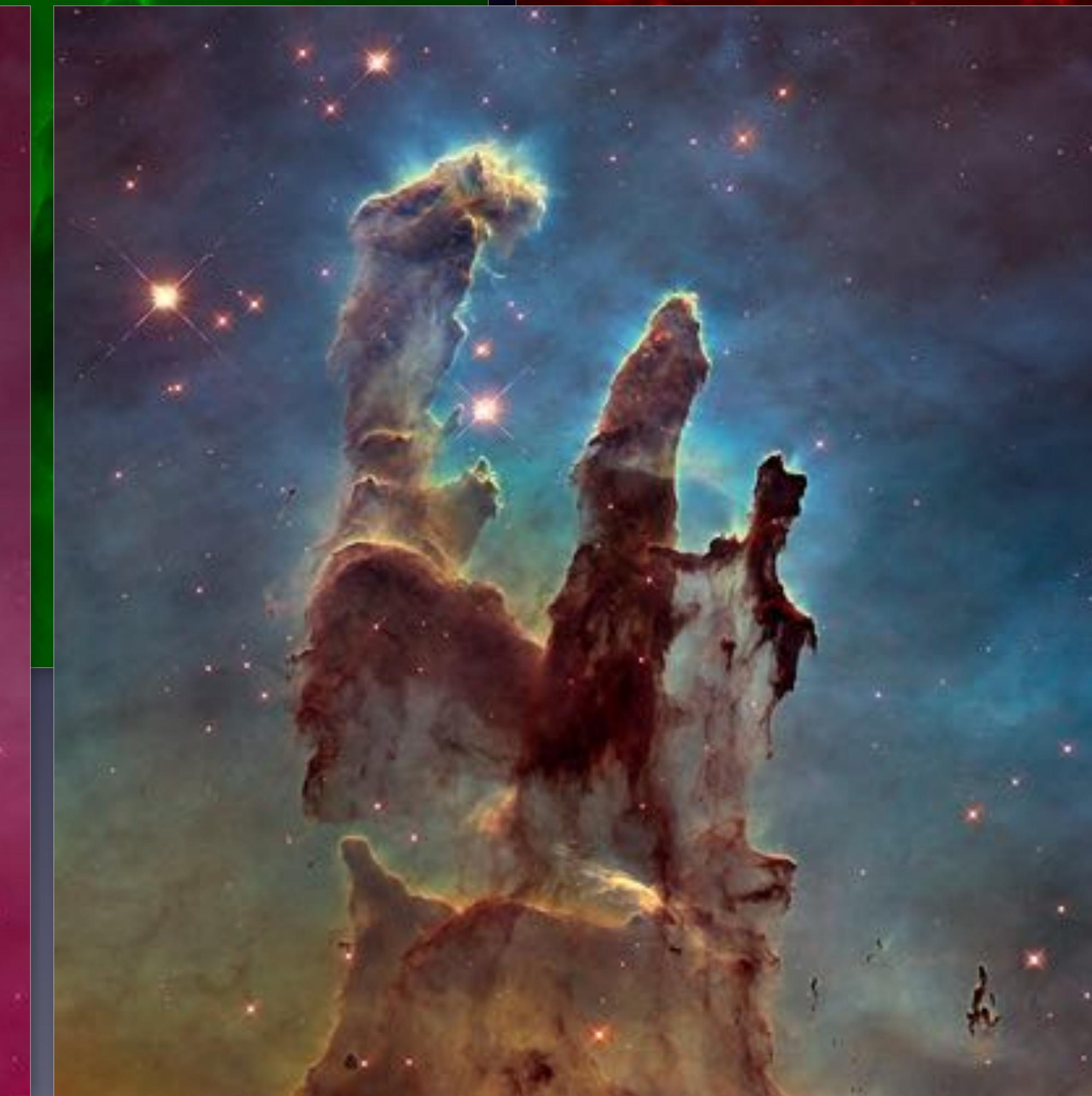


Color composite: narrow-band filters









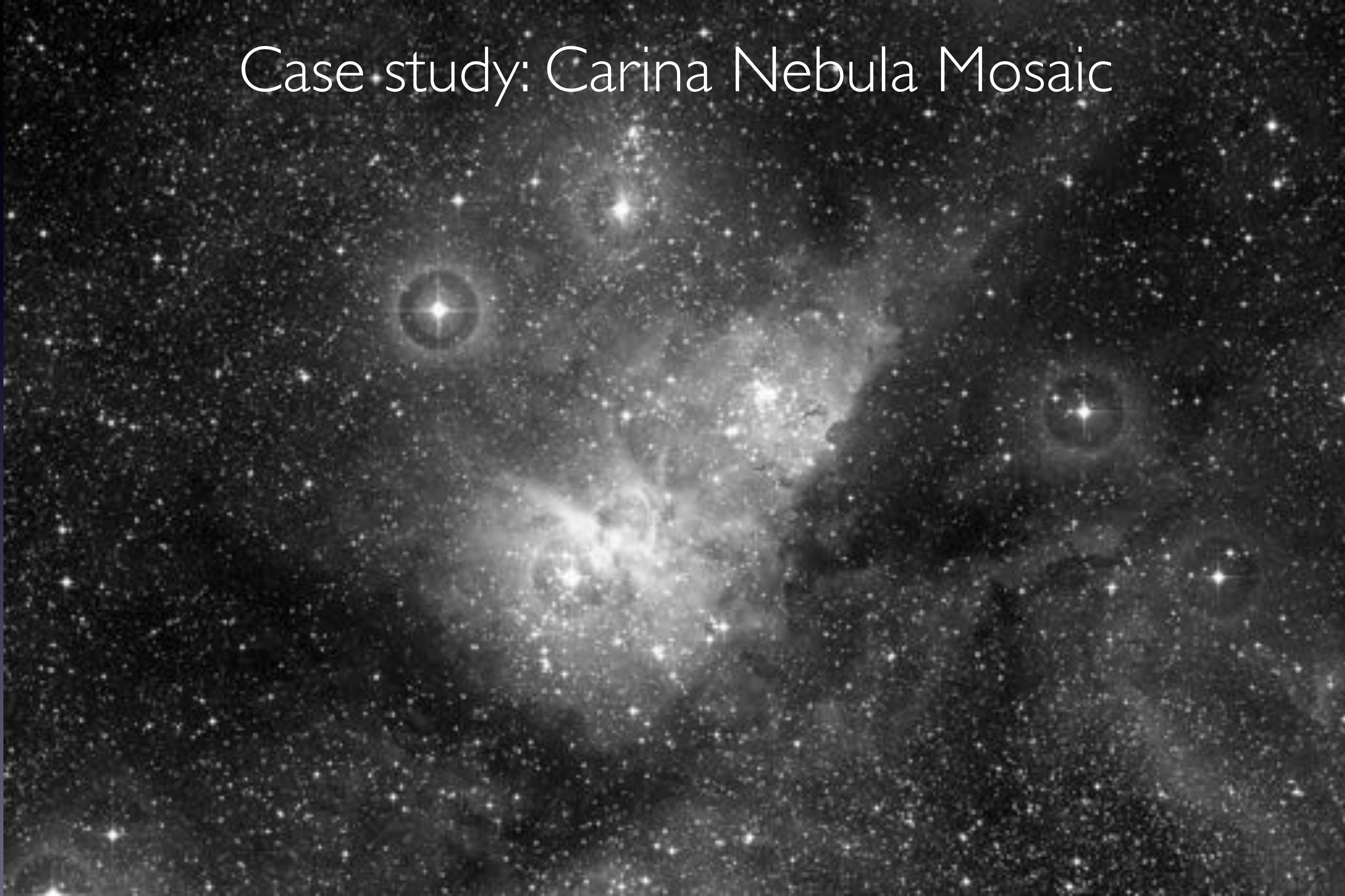
Post-processing

- ❖ Color
- ❖ Tonality
- ❖ Crop
- ❖ Retouch

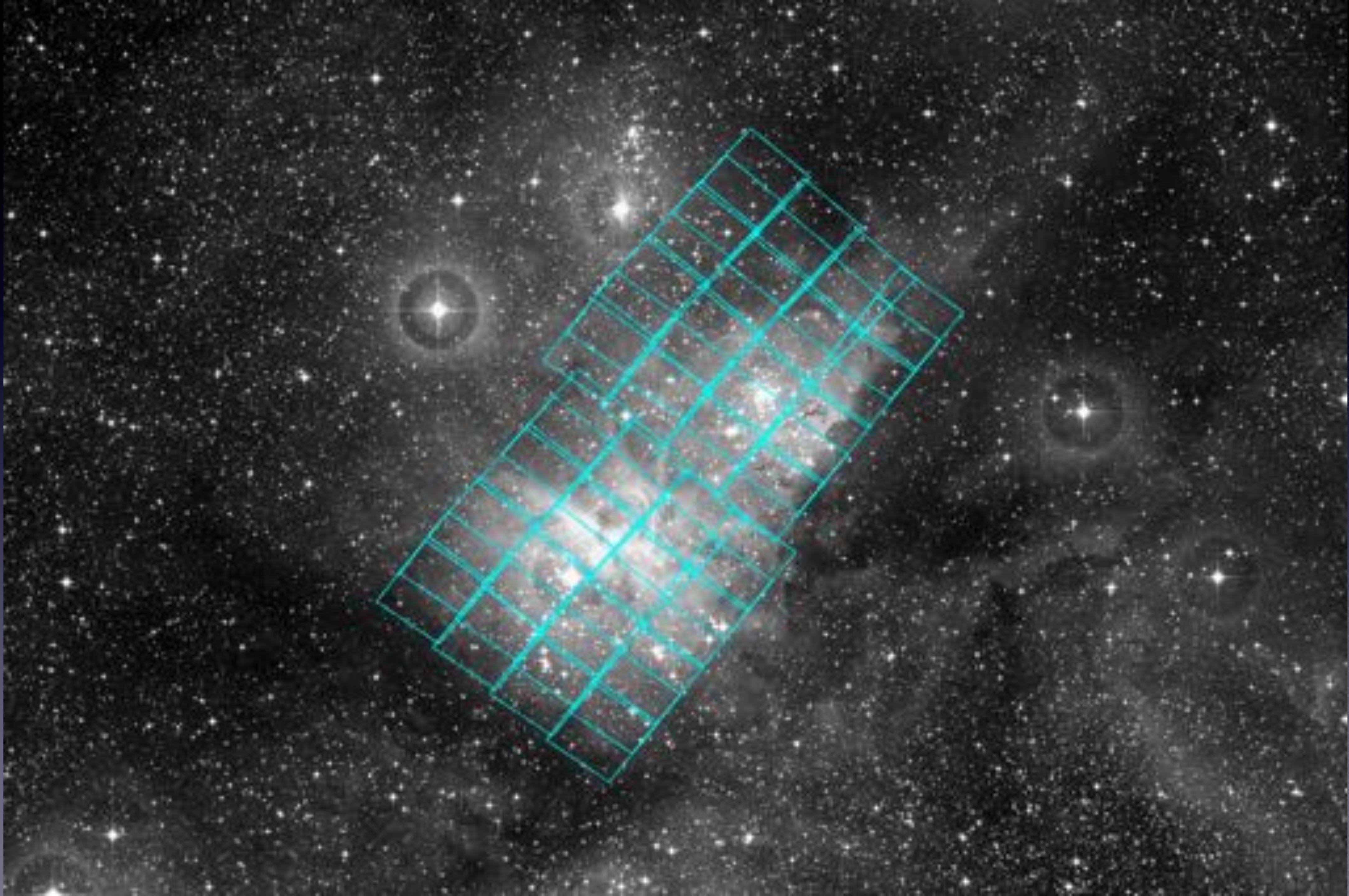


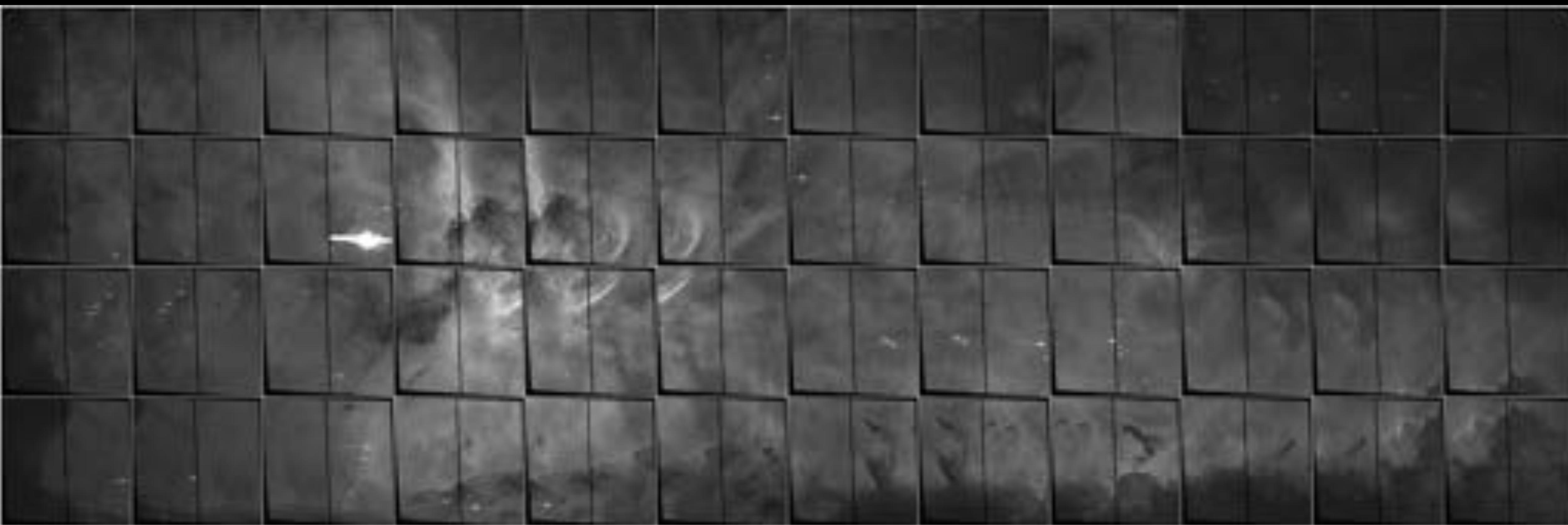


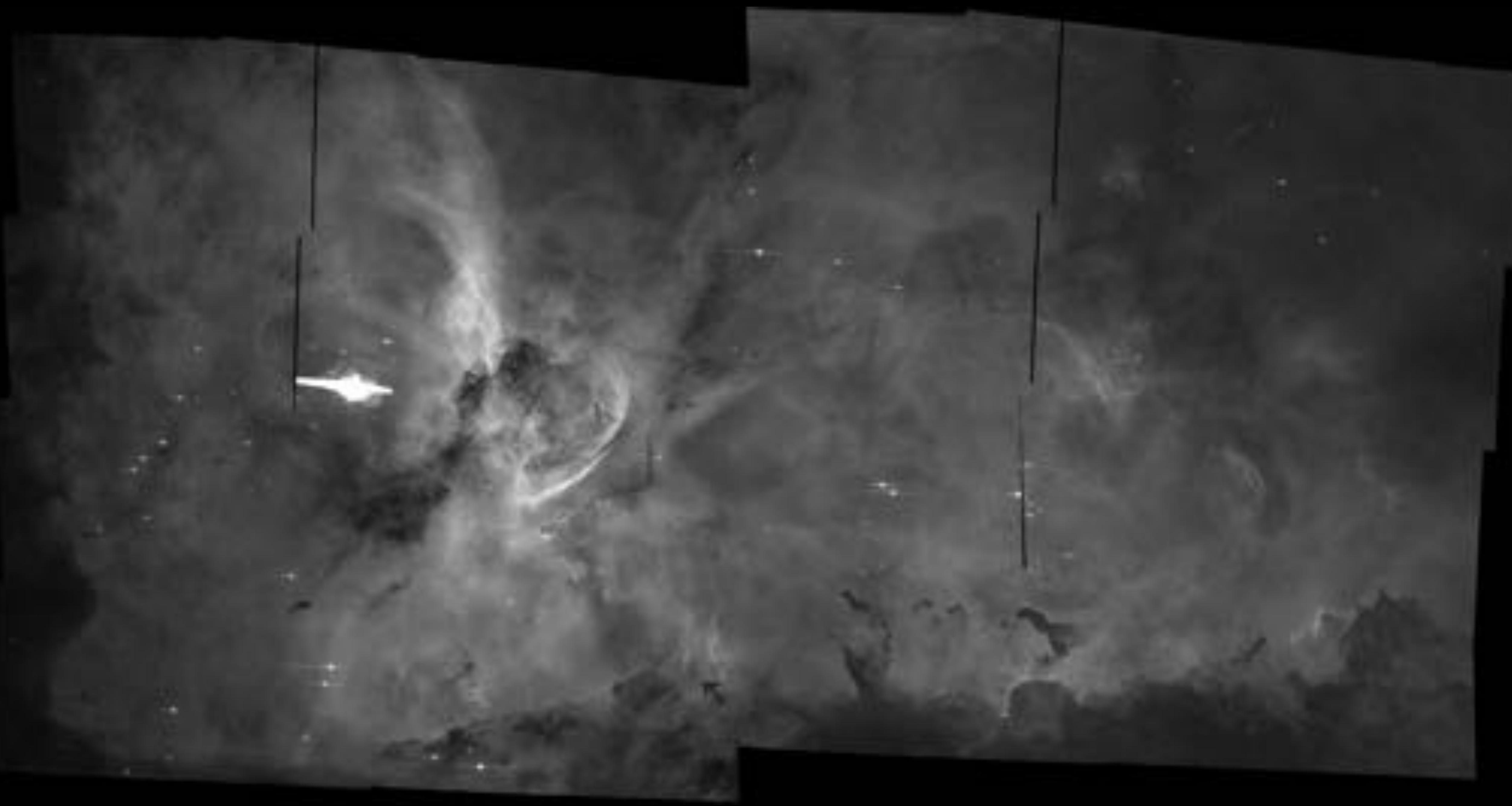
Case study: Carina Nebula Mosaic

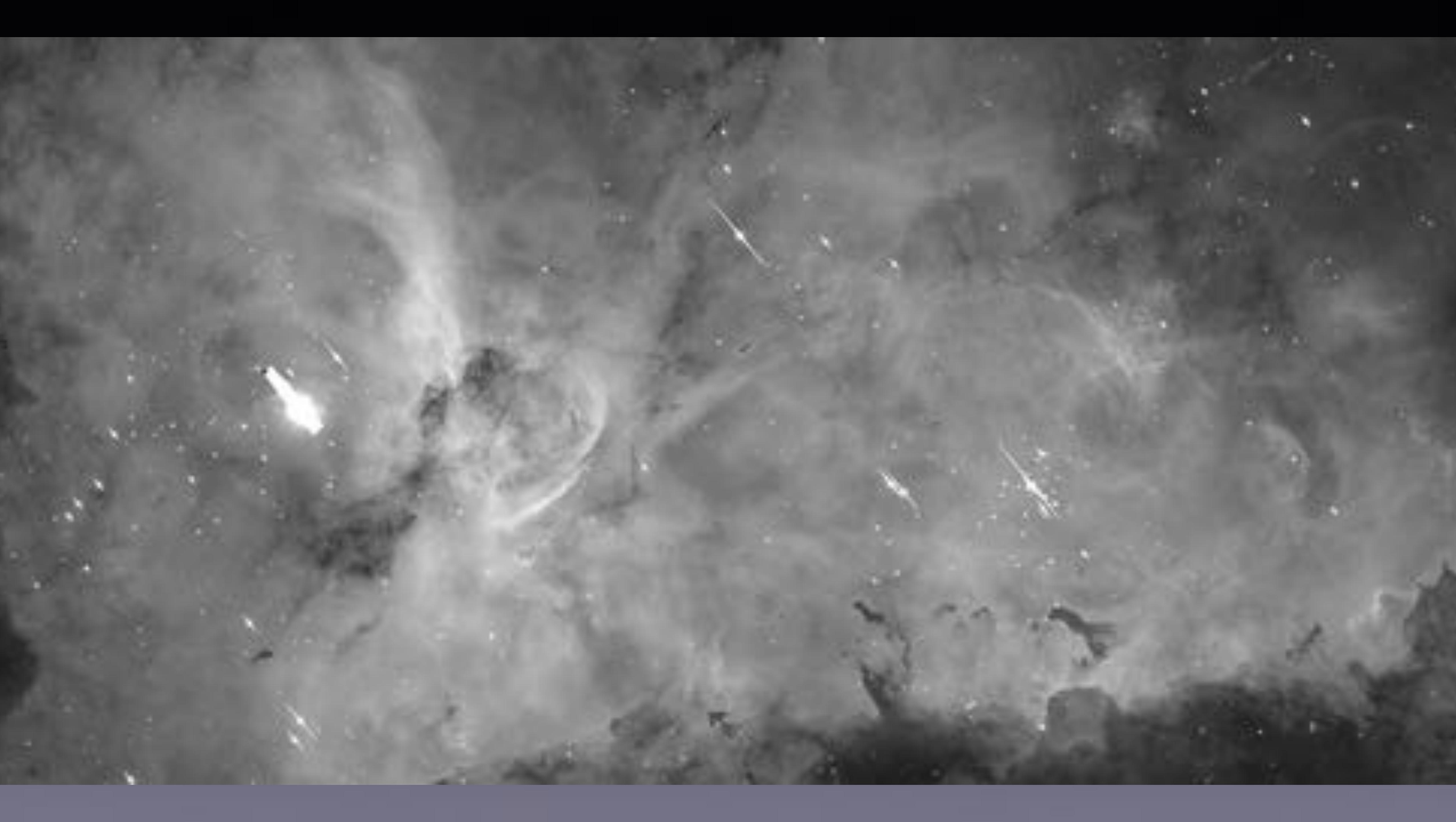


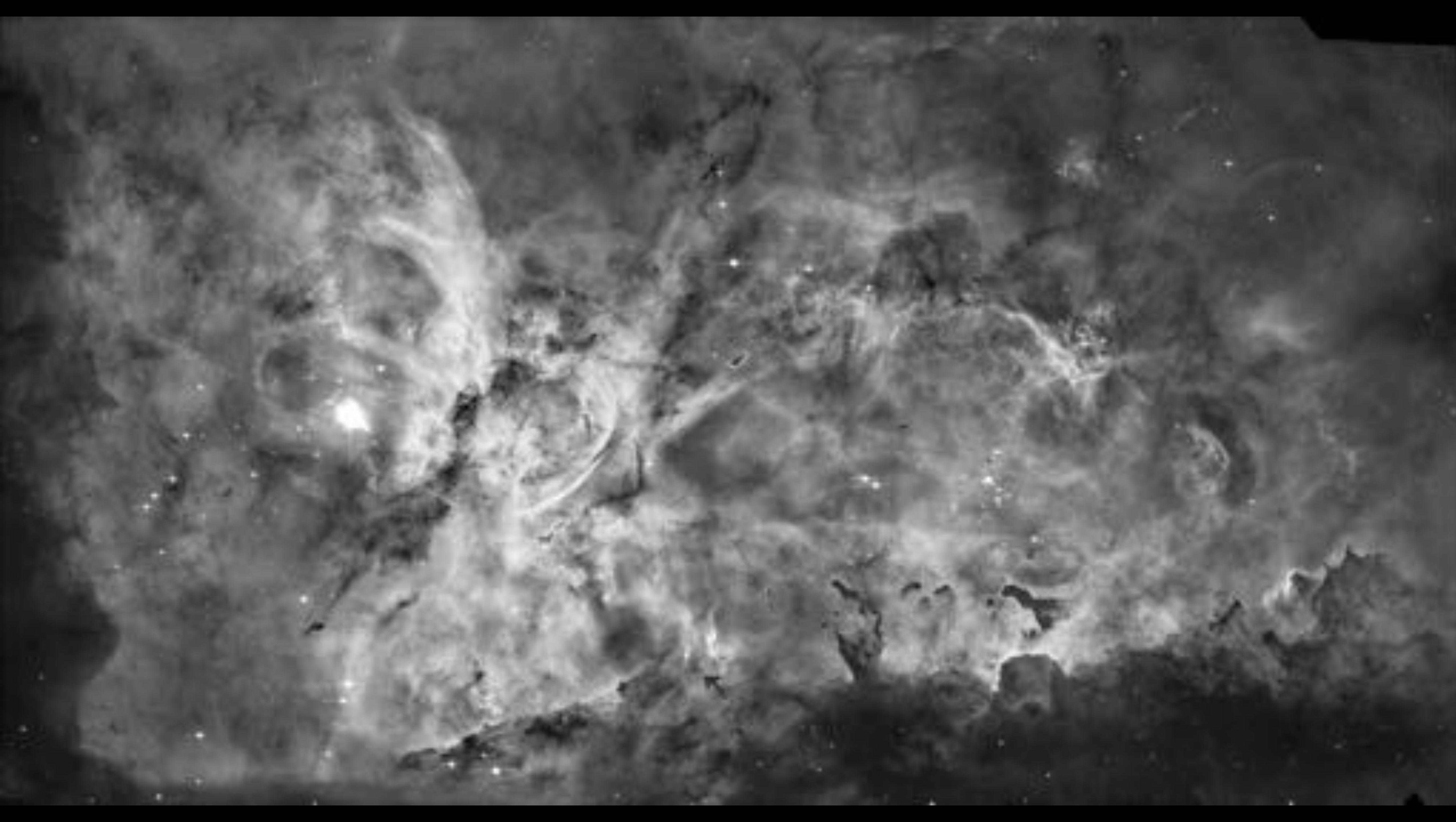








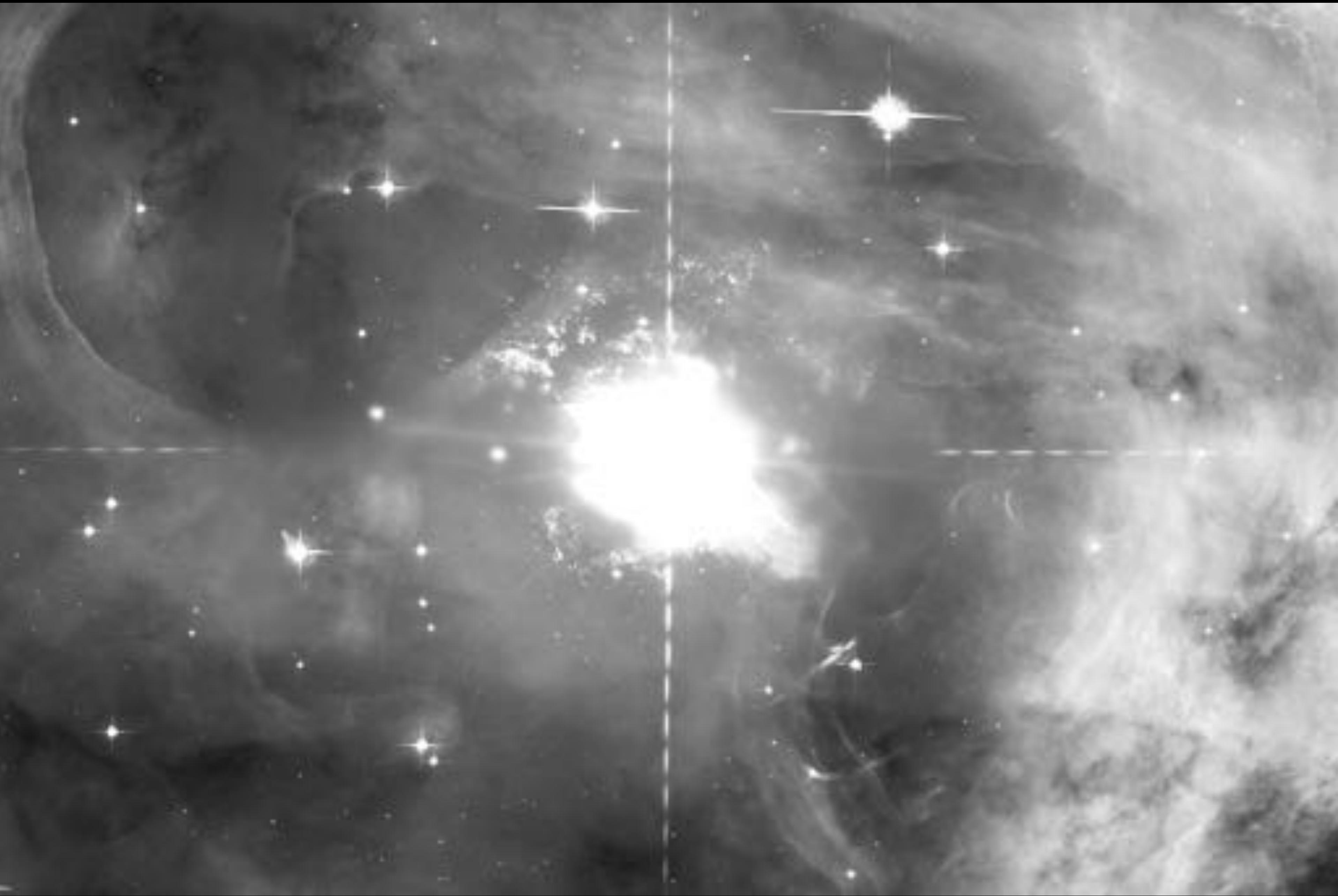


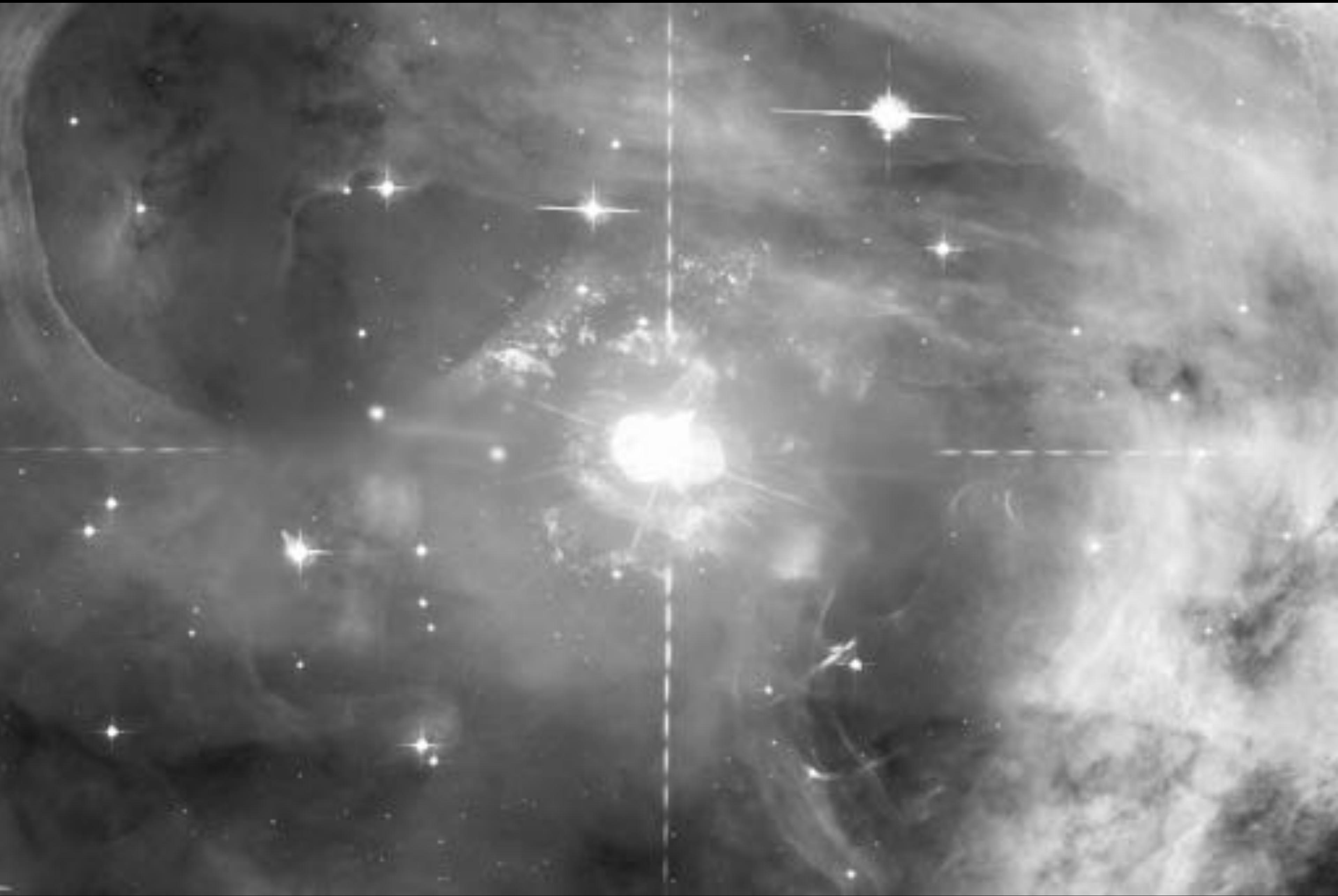






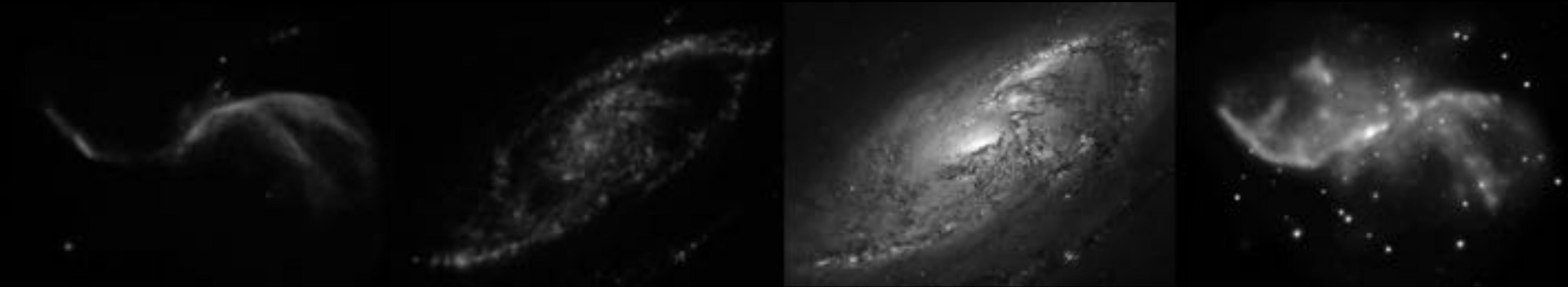




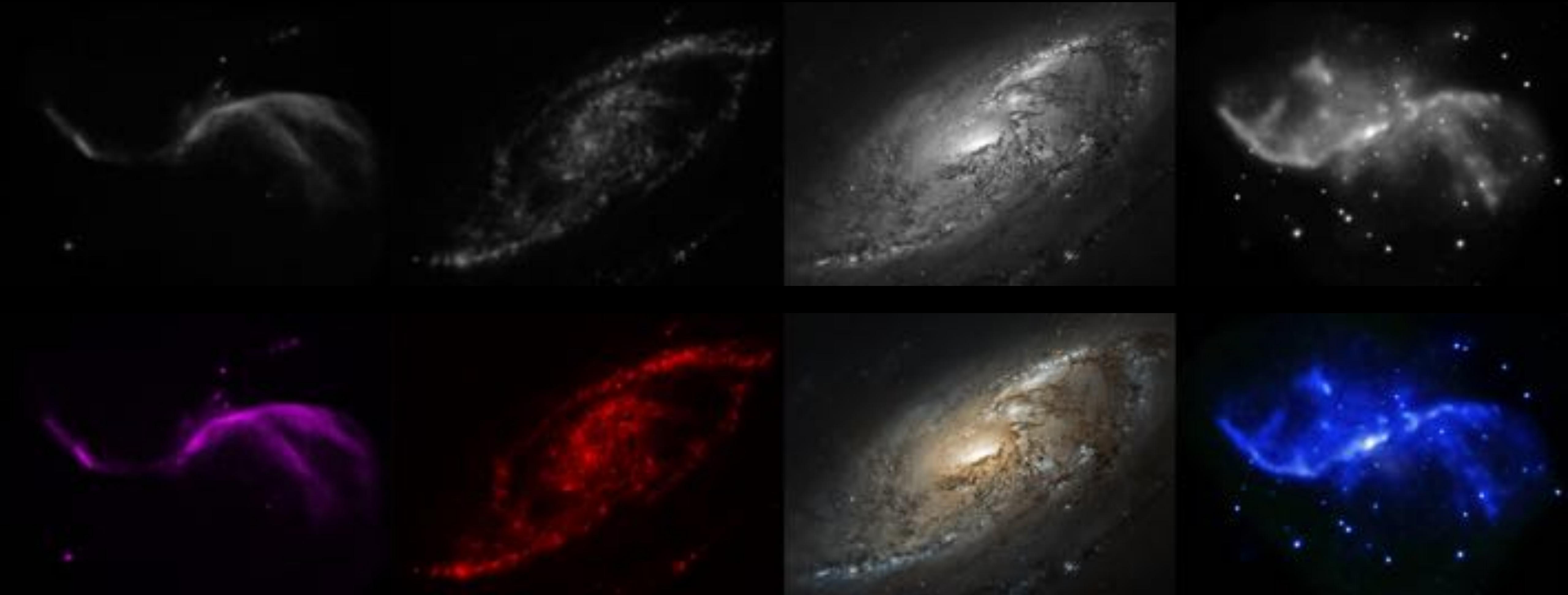




Multi-observatory composite

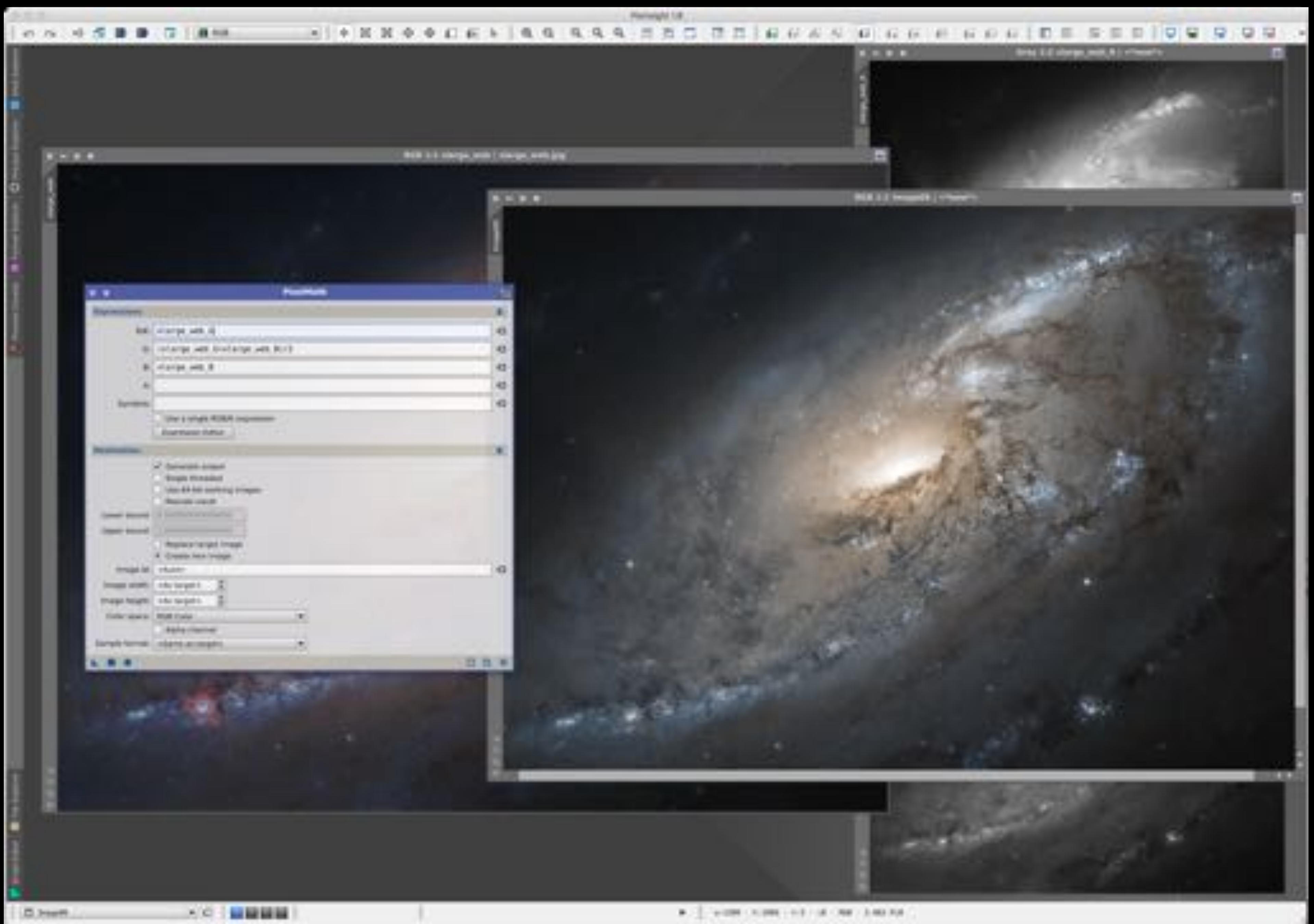


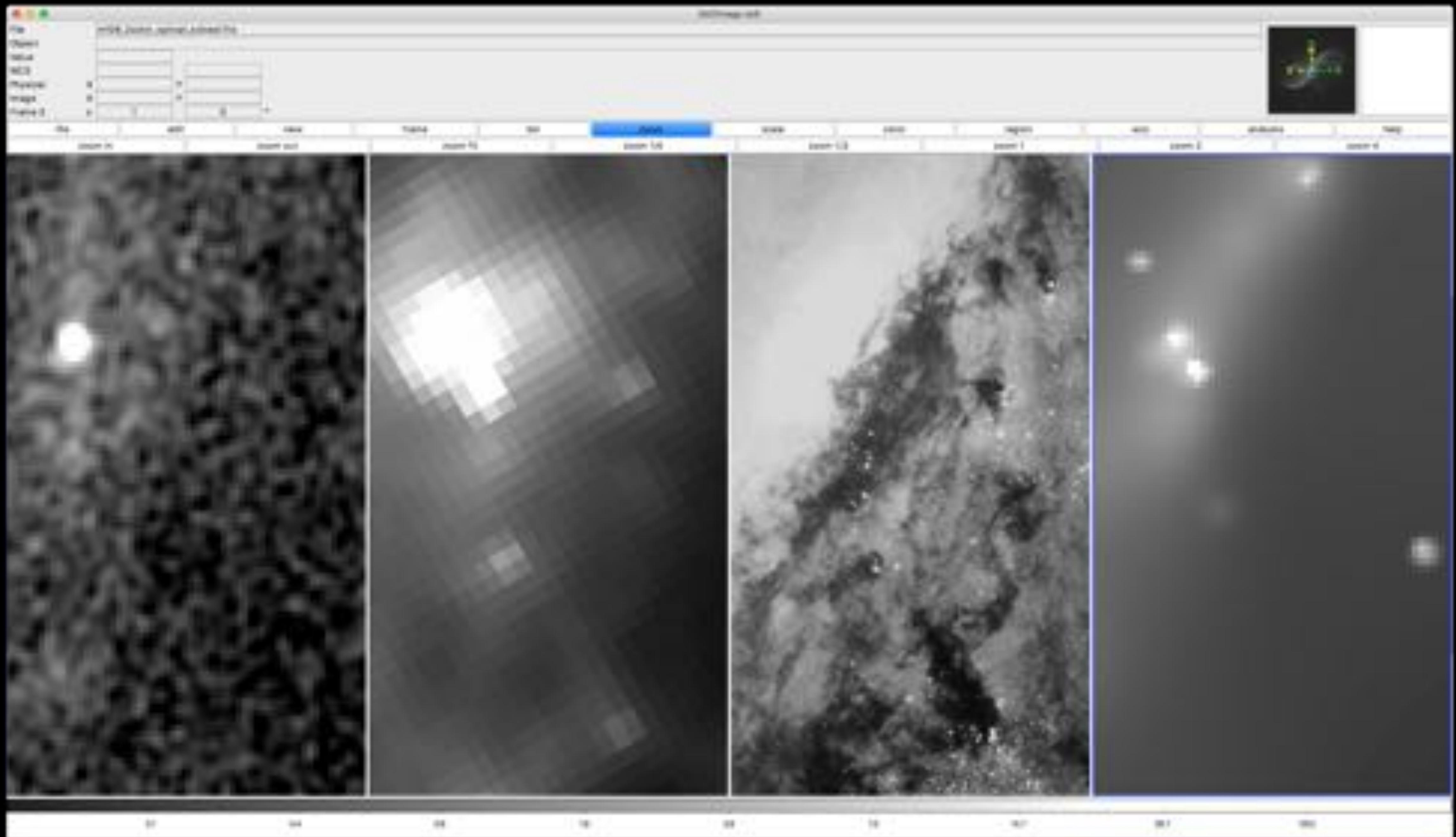
Multi-observatory composite

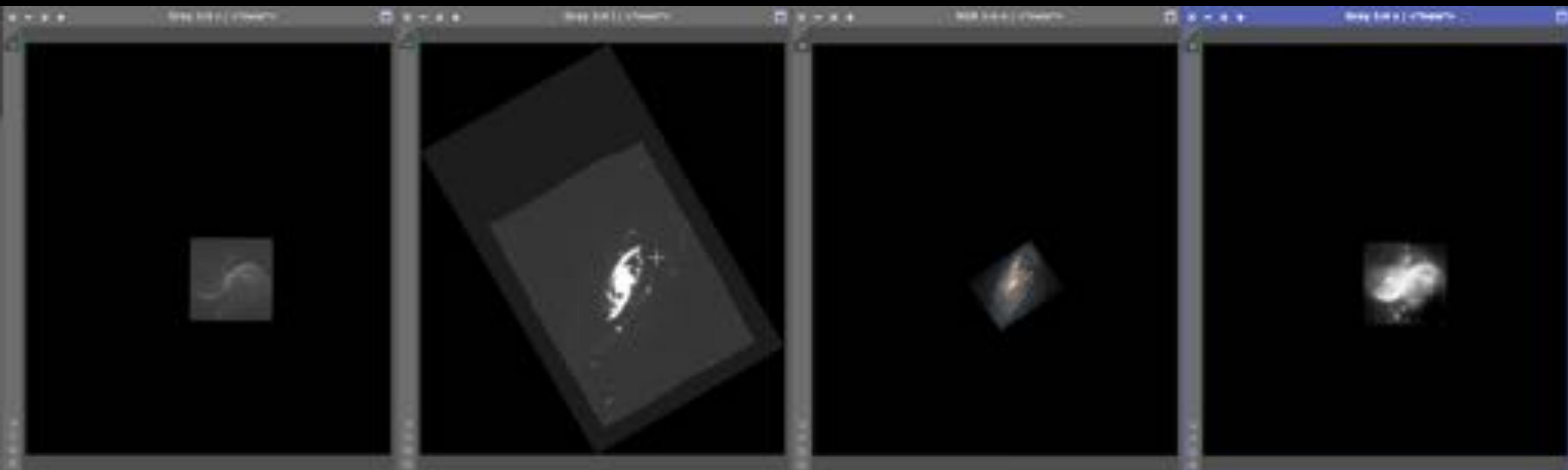


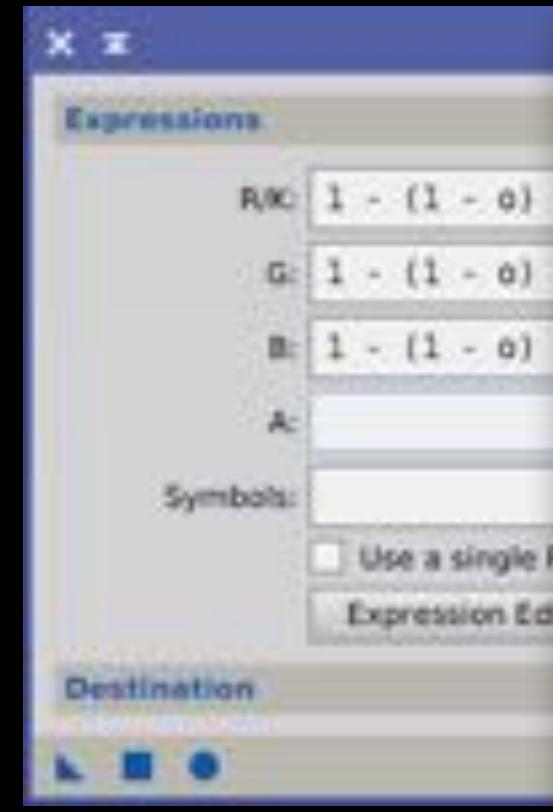


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Core Version 1.8
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- Darken
- Multiply
- Color Burn
- Linear Burn
- Darker Color
- Lighten
- Screen**
- Color Dodge
- Linear Dodge (Add)
- Lighter Color
- Overlay
- Soft Light
- Hard Light
- Vivid Light
- Linear Light
- Pin Light
- Hard Mix
- Difference
- Exclusion
- Subtract
- Divide

$f(a,b)$

$(1 - b)$



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