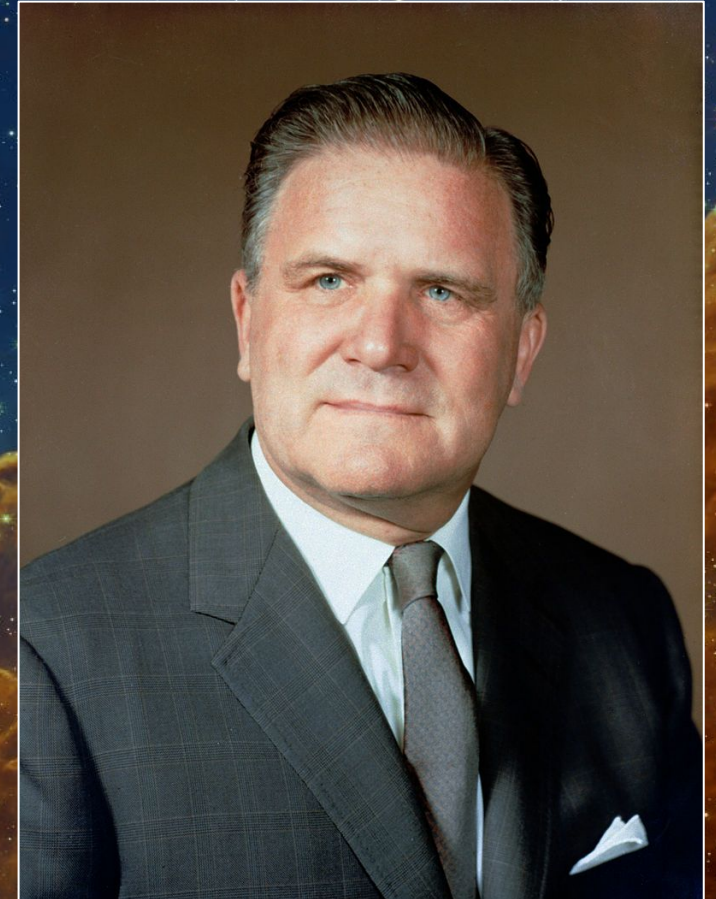




PROCESSING JWST DATA



James Webb?

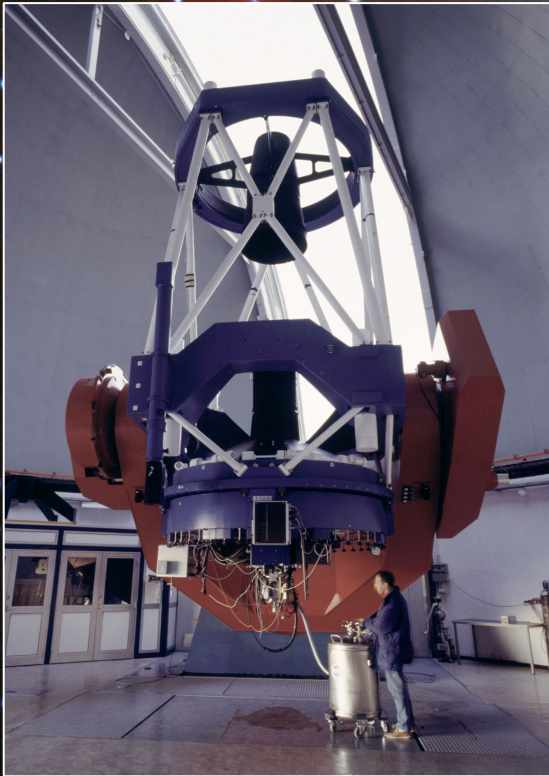


James E. Webb, as appointed
by President Lyndon B.
Johnson.

Colours



2.2m MPG/ESO
La Silla observatory



M45 'Pleiades'
Wideband



Ianto Evans

AE Aurigae
Ha/OIII



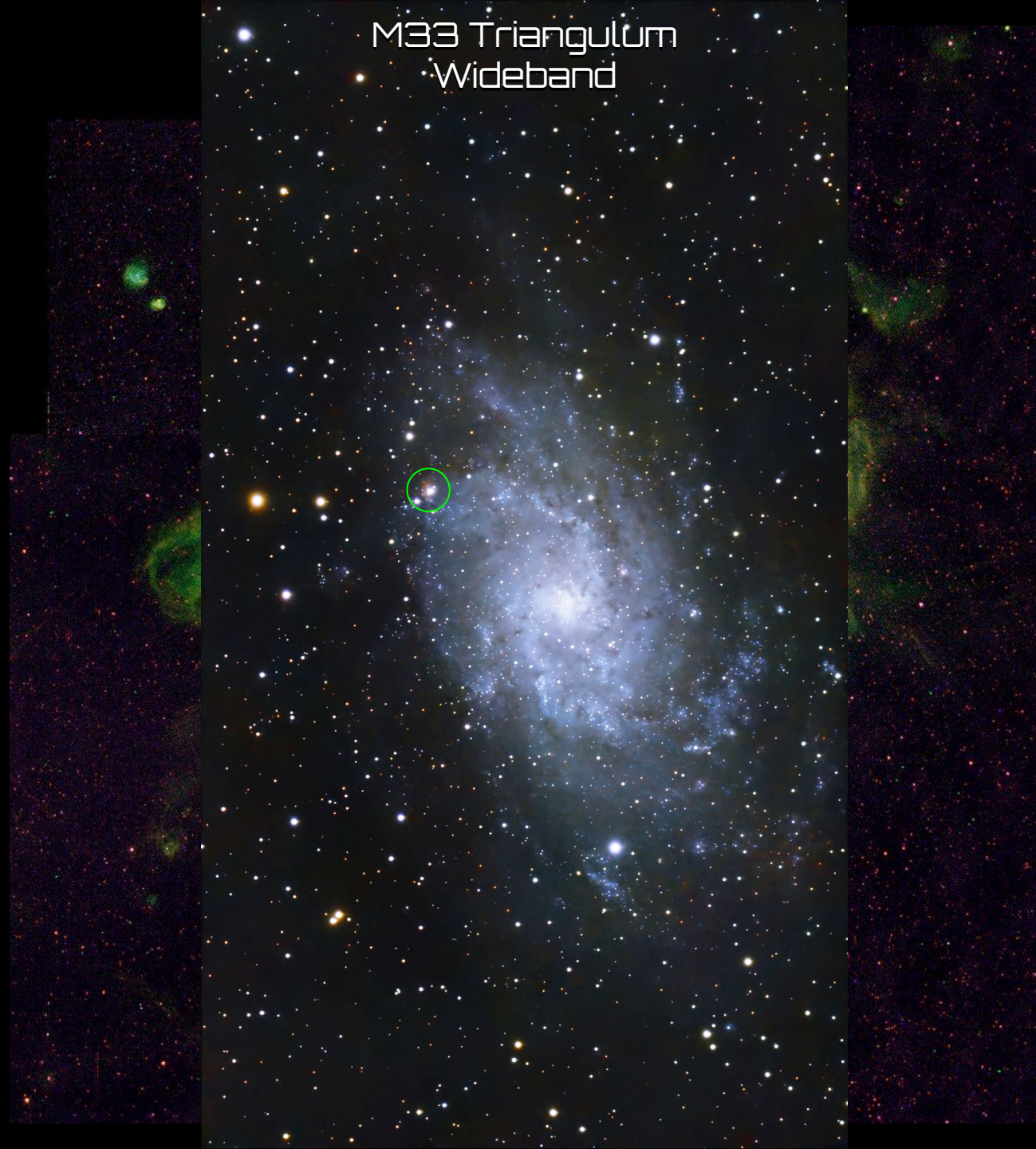
AE Aurigae
Wideband



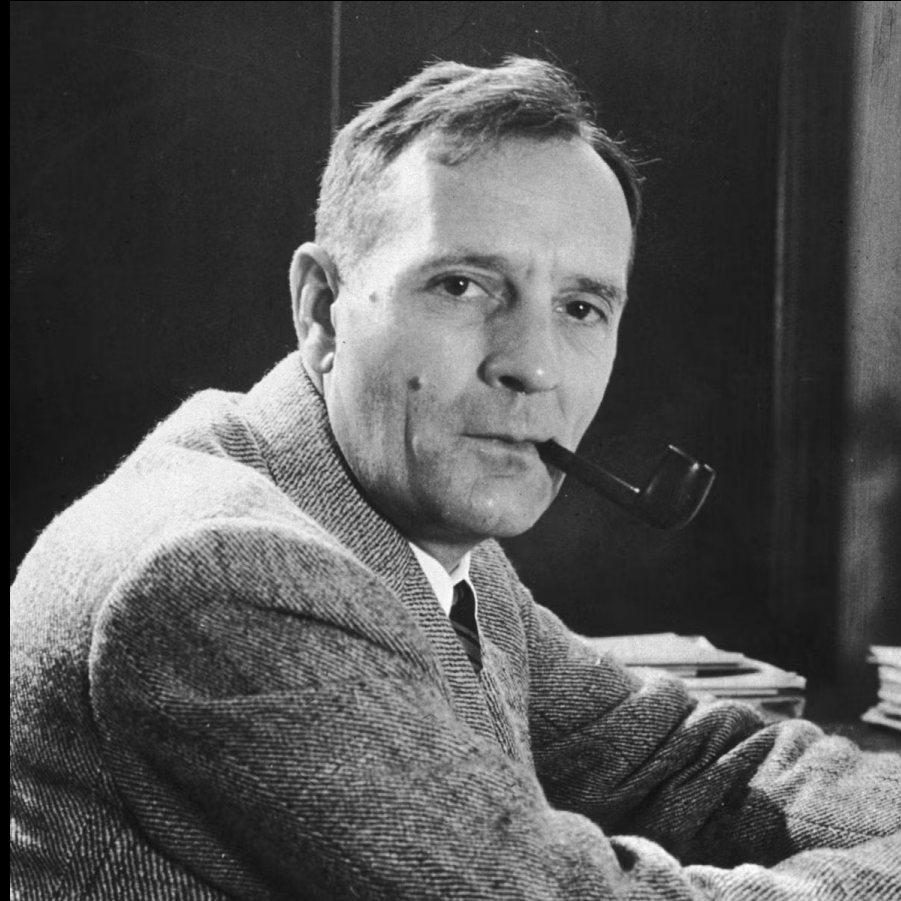
Western Veil Nebula
Ha/OIII



M33 Triangulum
Wideband



HUBBLE IS



LYING TO
YOU

Fictional Nebulae

Star Trek II
The Wrath of Khan
1982



Star Trek VIII
First Contact
1996



Star Trek X
Nemesis
2002



A vibrant cosmic nebula with swirling green, blue, and purple gases and numerous bright stars. The text "BE CREATIVE" is centered in a bold, white, sans-serif font with a black outline.

BE CREATIVE

ESA/Hubble

<https://esawebb.org/images/weic2205a>

<https://esahubble.org/>



What looks much like craggy mountains in the Carina Nebula. Captured in infrared light by the James Webb Space Telescope, this image reveals previous

Called the Cosmic Cliffs, the region is a vast, turbulent area of gas and dust. The cavernous area has been carved by the massive, hot, young stars located in the region. The high-energy radiation from these stars is sculpting the nebula's walls.

NIRCam – with its crisp resolution and sensitivity – reveals the intricate details of the background galaxies. Several prominent

- The “steam” that appears to rise from the nebula due to intense, ultraviolet radiation.
- Dramatic pillars rise above the glowing

Colours & filters

Band	Wavelength	Telescope
Optical	900 nm	James Webb Space Telescope NIRCam
Infrared P-alpha	1.87 µm	James Webb Space Telescope NIRCam
Infrared	2.0 µm	James Webb Space Telescope NIRCam
Infrared molecular hydrogen	4.7 µm	James Webb Space Telescope NIRCam
Infrared PAH	3.35 µm	James Webb Space Telescope NIRCam
Infrared	4.44 µm	James Webb Space Telescope NIRCam

“Cliffs” in Carina



young, star-forming region NGC 3324 in the Carina Nebula. Captured by NASA/ESA/CSA James Webb Space

Telescope, this image reveals the intricate details of the background galaxies. Several prominent

hidden stars, and even numerous

and hot dust streaming away from

ion from the young stars.

Subscribe to Webb News



Contact



Search...

About the Image

Id:	weic2205a
Type:	Observation
Release date:	12 July 2022, 17:20
Related releases:	weic2205
Size:	14575 x 8441 px

Image Formats

- Fullsize Original 137.0 MB checksum
- Large JPEG 17.0 MB
- Publication TIFF 10K 63.2 MB
- Publication TIFF 4K 11.2 MB
- Publication JPEG 2.3 MB
- Screensize JPEG 284.9 KB

Zoomable



Wallpapers

- 1024x768 377.0 KB
- 1280x1024 565.2 KB
- 1600x1200 762.3 KB
- 1920x1200 899.9 KB
- 2048x1536 1.1 MB



Select a collection...
MAST Observations by Object Name or RA/Dec 

and enter target:
 

[About Collections...](#)
[Show Examples...](#)
[Random Search](#)
[Advanced Search](#)

 Upload Target List
 My Download Basket: 0 files


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MAST Archive

[Home Page](#)

MAST: Barbara A. Mikulski Archive for Space Telescopes

The MAST Portal lets you search multiple collections of astronomical datasets all in one place. Use this tool to find astronomical data, publications, and images.

Note: This site uses cookies in order to monitor feature usage, track user preferences, and provide authentication for some services. By using this site you consent to the use of cookies for such purposes.

What's New

JWST Instrument metadata have changed. Now, the complete configuration is specified; for example, an Observation previously labeled "MIRI" might now be labeled "MIRI/IMAGE." This update brings JWST metadata in line with HST and allows for greater specificity in your search. See the [JWST Instrument Names](#) page for a full list of configurations.

Data from [FIMS-SPEAR](#), a joint Korean-US UV satellite, are now available in MAST. In addition to its invaluable spectral maps of the UV sky, FIMS-SPEAR has paved the way for us to ingest new cubesat, balloon, and small-rocket missions. Stay tuned as we add more of these missions to our collection!

You can now [access the PLATO MAST Catalog](#) using the API or catalog search form.

Data Retrieval Notes

- **MAST FTP:** Starting October 25 2021, the MAST FTP server archive.stsci.edu will no longer support unencrypted FTP connections. Only encrypted FTPS will be supported. Read more about this change and some related FAQ on the [MAST FTP Service page](#).
- **Auth.MAST Authentication:** New authentication mechanism for accessing exclusive access data via cURL or Astroquery. Please visit <https://auth.mast.stsci.edu> for authentication needs or view the [tutorial video](#).
- **Access MAST Programmatically:** with [Astroquery](#) or the [general API](#).

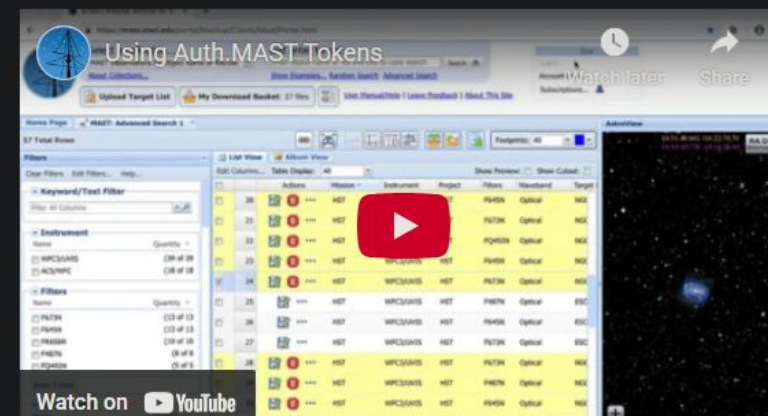
Release Notes

[MAST Portal software release notes](#).

Currently available data collections:

- **MAST Observations:** Millions of observations from JWST, Hubble, Kepler, GALEX, IUE, FUSE, and more.
- **Virtual Observatory:** Search thousands of astronomical data archives from around the world for images, spectra, and catalogs.
- **Hubble Source Catalog:** A master catalog with a hundred million measurements of objects in Hubble images.
- **MAST Catalogs:** Access to catalog data such as Gaia and TESS Input Catalog, with more coming soon.

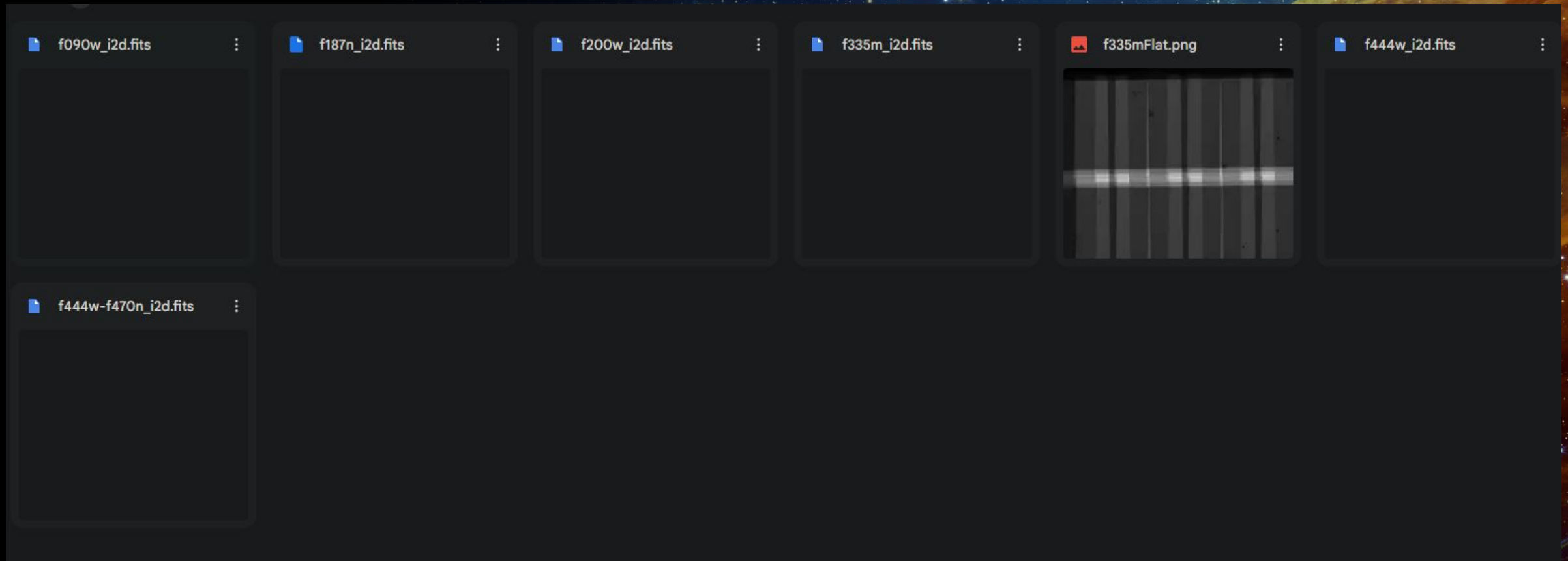
Featured tutorial: Using Auth.MAST, MAST's authorization token system.



The screenshot shows the MAST Portal's advanced search interface. At the top, there's a search bar and navigation links. Below, a table displays search results with columns for Name, Quantity, and various filters. A red play button is overlaid on the table, indicating a video tutorial. The bottom of the interface features a 'Watch on YouTube' button.

Google Drive Data

<https://drive.google.com/drive/u/2/folders/1qjublUBZBwBHOfSO3fSxTgf0maZ69zyl>



Data

'The 29 [NIRCam filters](#) have names "Fnnnx" where "nnn" refers to the central wavelength (e.g., 220 for 2.20 μm) and "x" refers to the filter width: "W2" for extra-wide ($R \sim 1$), "W" for wide ($R \sim 4$), "M" for medium ($R \sim 10$) and "N" for narrowband ($R \sim 100$).'

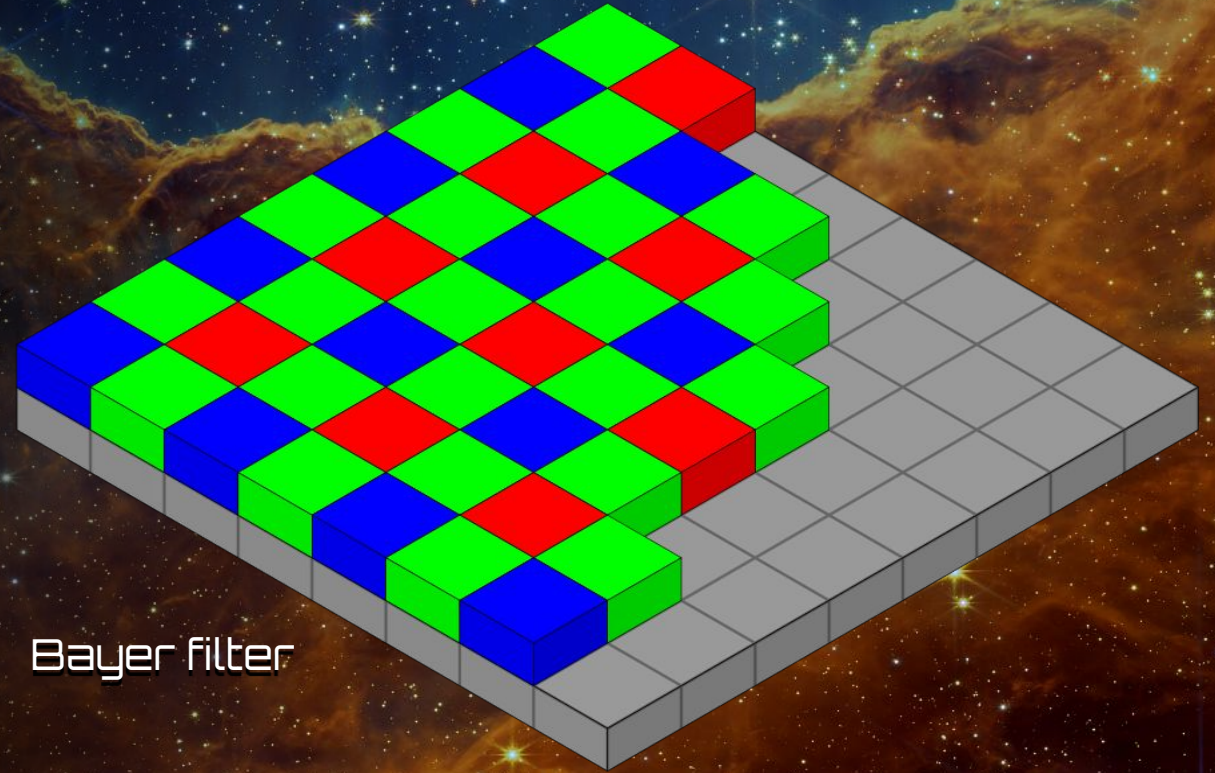


\$10 Billion

<https://jwst-docs.stsci.edu/jwst-near-infrared-camera>

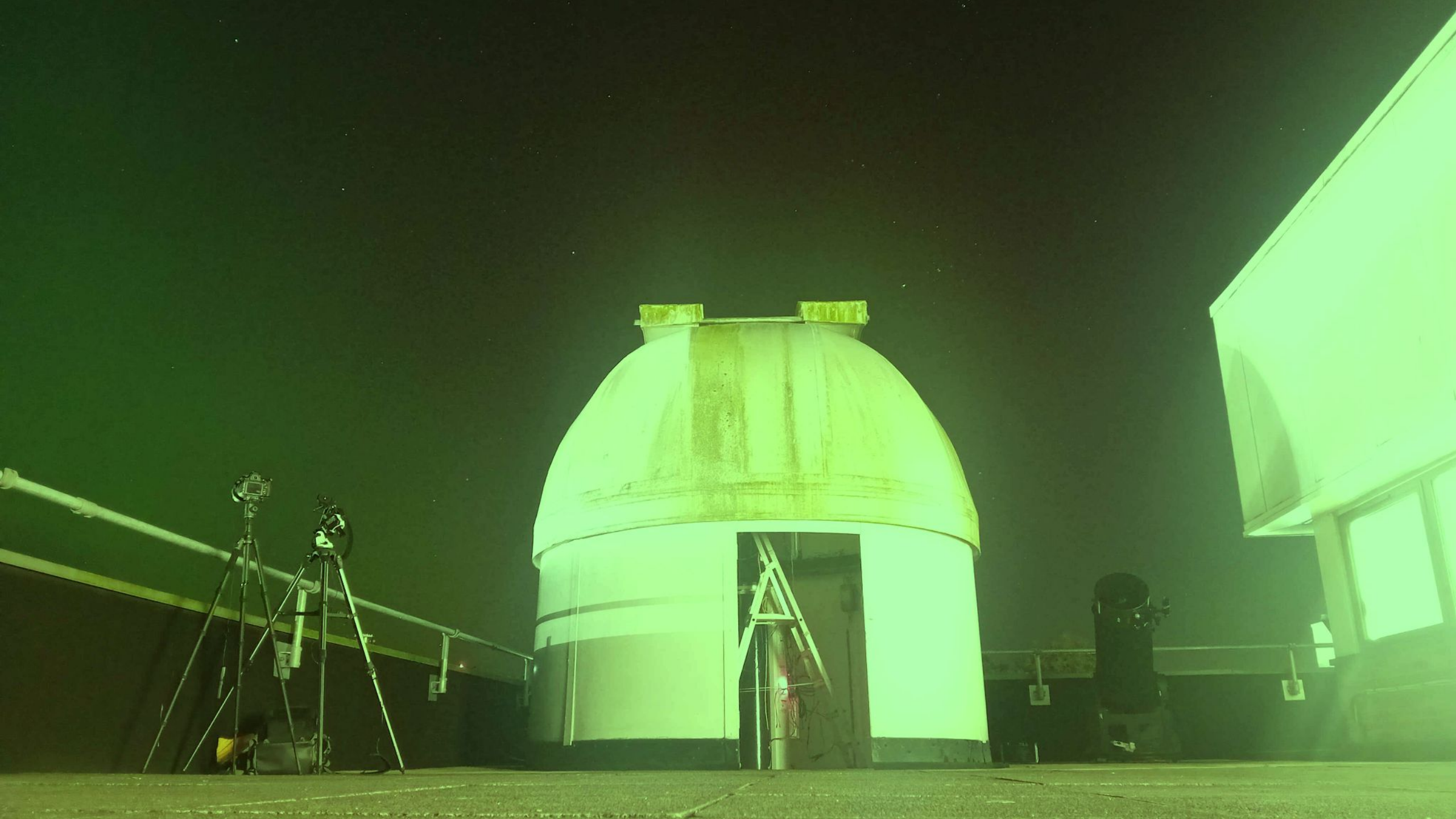
What is a .FITS? ...or a .FIT?

Flexible Image Transport System



Bayer filter

.fits?



The image features the GIMP logo, which consists of the letters "GIMP" in a bold, white, sans-serif font. The logo is centered horizontally and has a subtle drop shadow. The background is a dark, grayscale image of a starry night sky with numerous bright stars and faint, wispy clouds. The stars vary in size and brightness, creating a sense of depth and vastness. The overall composition is simple and visually appealing, with the white text standing out against the dark, textured background.

GIMP

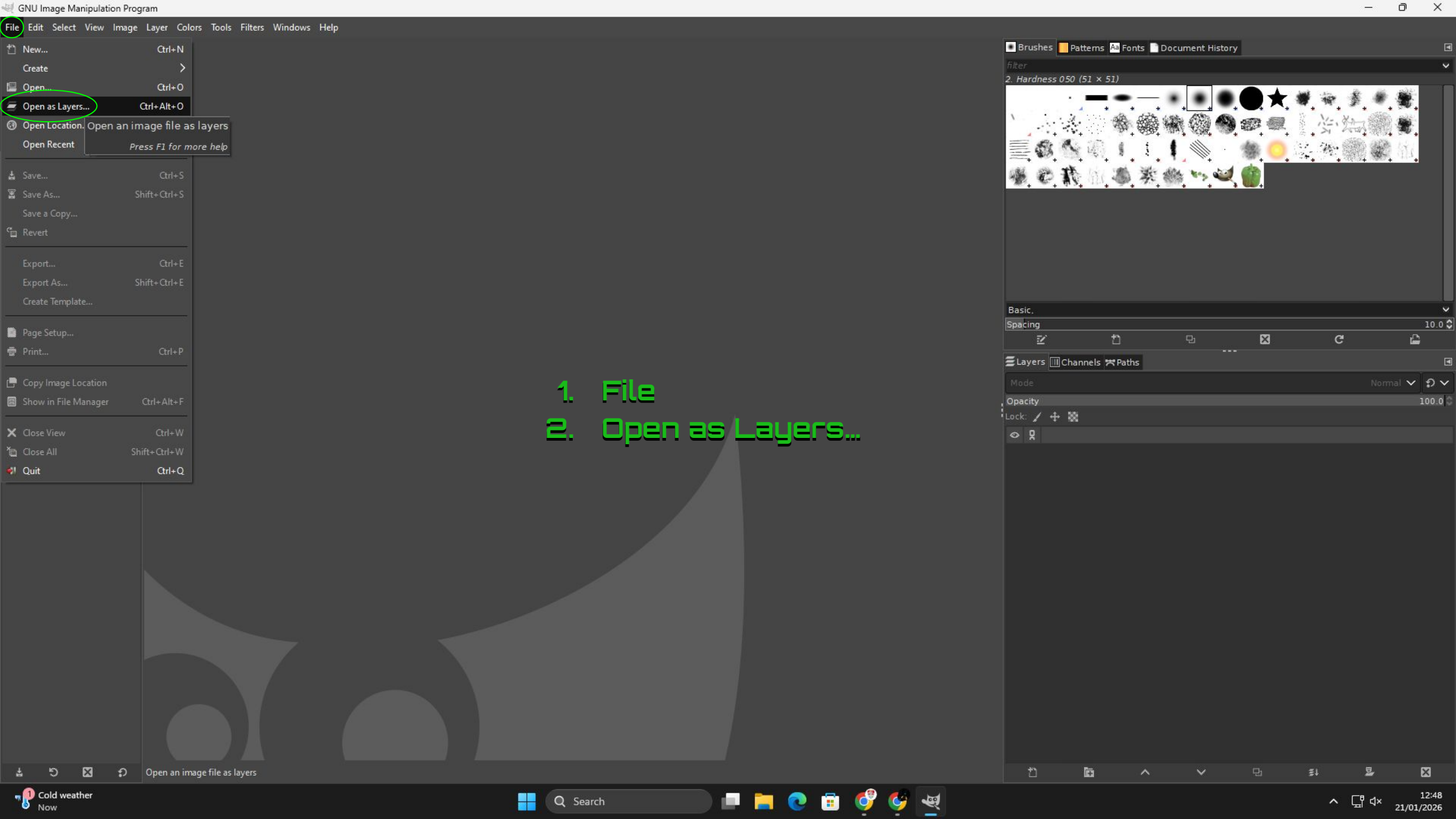
GIMP

Replacement for undefined pixels

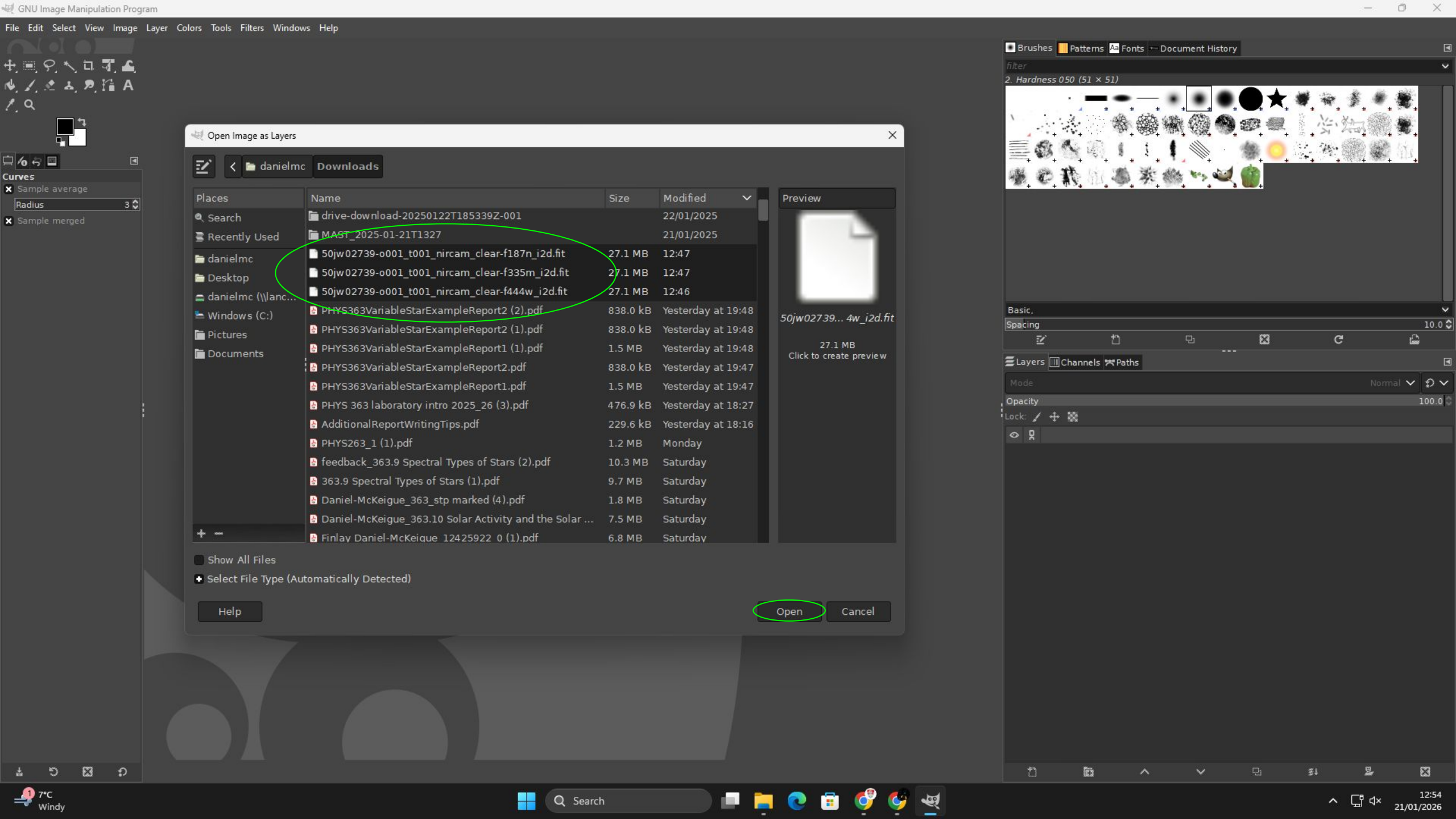
Stretching!

- Histograms
- Logarithms
- Curves

Blend mode Lighter



1. File
2. Open as Layers...



Open Image as Layers

Places

Search

Recently Used

danielmc

Desktop

danielmc (\\lanc...

Windows (C:)

Pictures

Documents

Name	Size	Modified
drive-download-20250122T185339Z-001		22/01/2025
MAST_2025-01-21T1327		21/01/2025
50jw02739-o001_t001_nircam_clear-f187n_i2d.fit	27.1 MB	12:47
50jw02739-o001_t001_nircam_clear-f335m_i2d.fit	27.1 MB	12:47
50jw02739-o001_t001_nircam_clear-f444w_i2d.fit	27.1 MB	12:46
PHYS363VariableStarExampleReport2 (2).pdf	838.0 kB	Yesterday at 19:48
PHYS363VariableStarExampleReport2 (1).pdf	838.0 kB	Yesterday at 19:48
PHYS363VariableStarExampleReport1 (1).pdf	1.5 MB	Yesterday at 19:48
PHYS363VariableStarExampleReport2.pdf	838.0 kB	Yesterday at 19:47
PHYS363VariableStarExampleReport1.pdf	1.5 MB	Yesterday at 19:47
PHYS 363 laboratory intro 2025_26 (3).pdf	476.9 kB	Yesterday at 18:27
AdditionalReportWritingTips.pdf	229.6 kB	Yesterday at 18:16
PHYS263_1 (1).pdf	1.2 MB	Monday
feedback_363.9 Spectral Types of Stars (2).pdf	10.3 MB	Saturday
363.9 Spectral Types of Stars (1).pdf	9.7 MB	Saturday
Daniel-McKeigue_363_stp marked (4).pdf	1.8 MB	Saturday
Daniel-McKeigue_363.10 Solar Activity and the Solar ...	7.5 MB	Saturday
Finlay Daniel-McKeigue 12425922 0 (1).pdf	6.8 MB	Saturday

Preview

50jw02739... 4w_i2d.fit

27.1 MB

Click to create preview

Show All Files

Select File Type (Automatically Detected)

Help

Open

Cancel

Brushes Patterns Fonts Document History

filter

2 Hardness 050 (51 x 51)

Basic.

Spacing

10.0

Layers Channels Paths

Mode

Normal

Opacity

100.0

Lock

12:54 21/01/2026

Layers

nielmc Downloads

Name	Size	Modified	Preview
drive-download-20250122T185339Z-001		22/01/2025	
MAST_2025-01-21T1327		21/01/2025	
50jw02739-o001_t001_nircam_clear-f187n_i2d.fit	27.1 MB	12:47	
50jw02739-o001_t001_nircam_clear-f335m_i2d.fit	27.1 MB	12:47	
50jw02739-o001_t001_nircam_clear-f444w_i2d.fit	27.1 MB	12:46	
PHYS363VariableStarExampleReport2 (2).pdf	83		
PHYS363VariableStarExampleReport2 (1).pdf	83		
PHYS363VariableStarExampleReport1 (1).pdf	1.4		
PHYS363VariableStarExampleReport2.pdf	83		
PHYS363VariableStarExampleReport1.pdf	1.4		
PHYS 363 laboratory intro 2025_26 (3).pdf	47		
AdditionalReportWritingTips.pdf	22		
PHYS263_1 (1).pdf	1.4		
feedback_363.9 Spectral Types of Stars (2).pdf	10		
363.9 Spectral Types of Stars (1).pdf	9		
Daniel-McKeigue_363_stp marked (4).pdf	1.4		
Daniel-McKeigue_363.10 Solar Activity and the Solar ...	7.4		
Firlav Daniel-McKeigue_12425922_0 (1).pdf	6.8 MB	Saturday	

Load FITS File

Replacement for undefined pixels

☐ Black

☒ White

Pixel value scaling

☒ Automatic

☐ By DATAMIN/DATAMAX

Image Composing

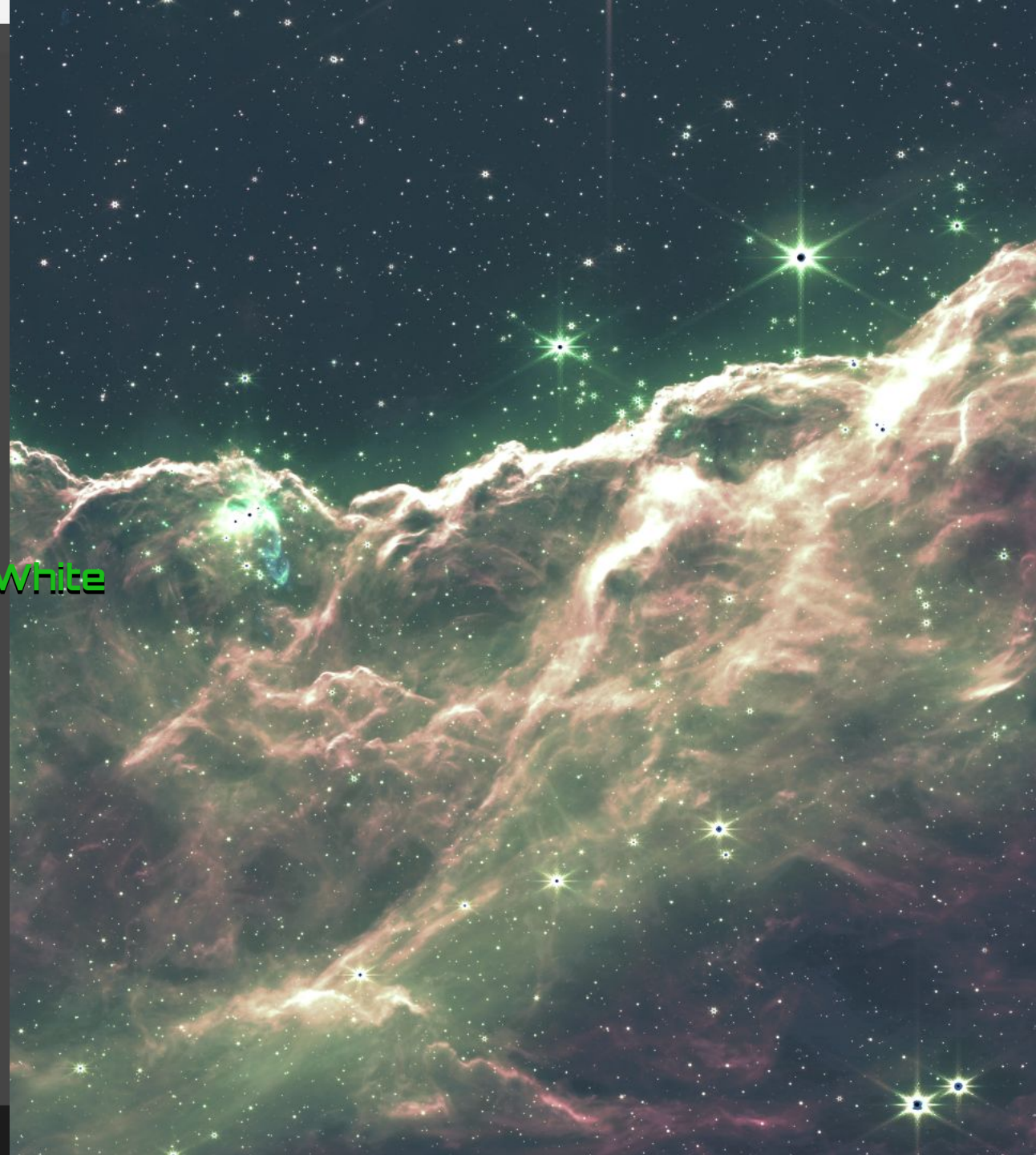
☒ None

☐ NAXIS=3, NAXIS3=2,...,4

Help Open Cancel

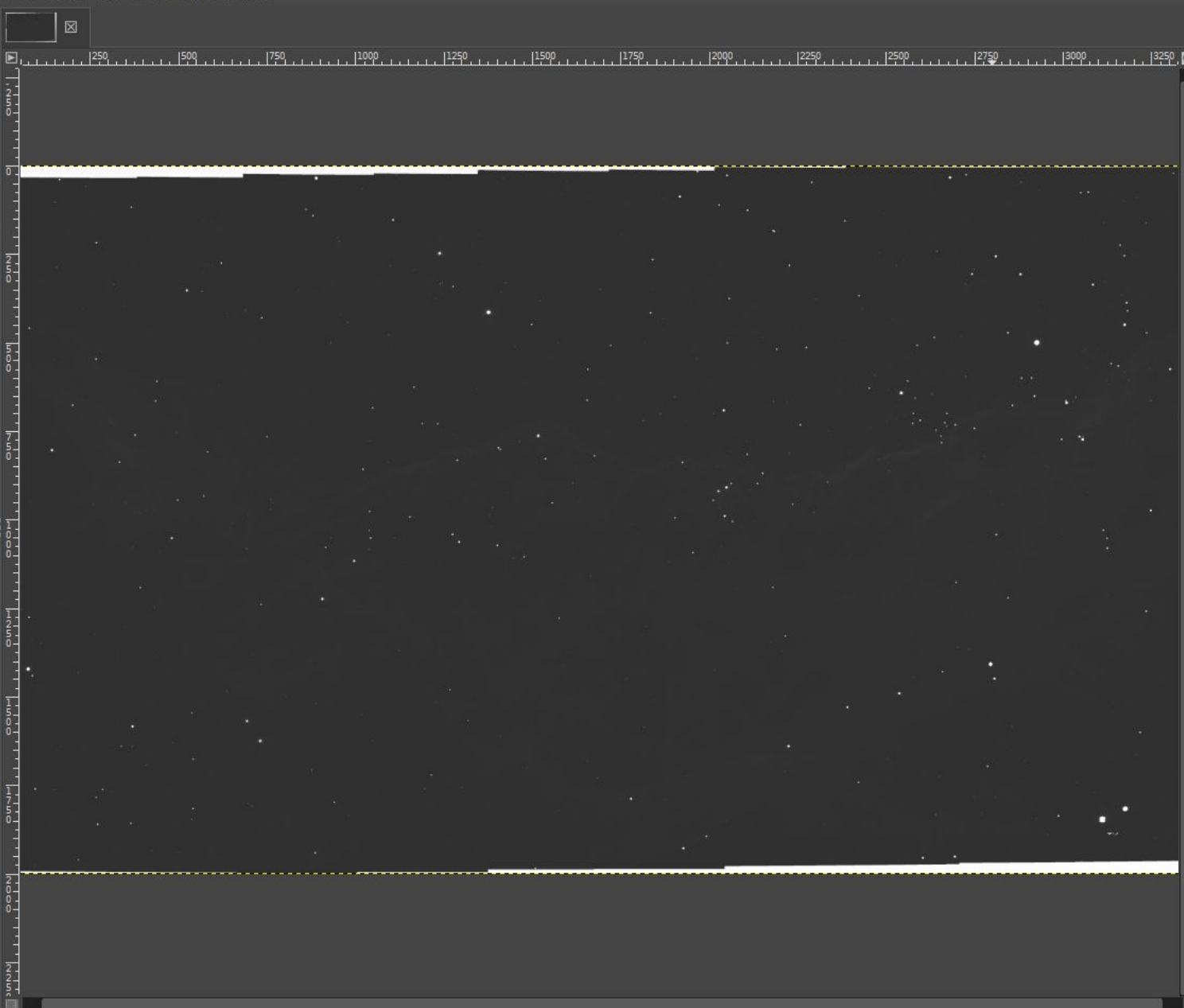
Open Cancel

White





Levels
X Sample average
Radius 3
X Sample merged



Brushes Patterns Aa Fonts Document History

filter

2. Hardness 050 (51 x 51)

Basic.
Spacing 10.0

Layers Channels Paths

Mode Normal

Opacity 100.0

Lock: / +

- f335m_i2d.fits
- f444w-f470n_i2d.fits
- f444w_i2d.fits

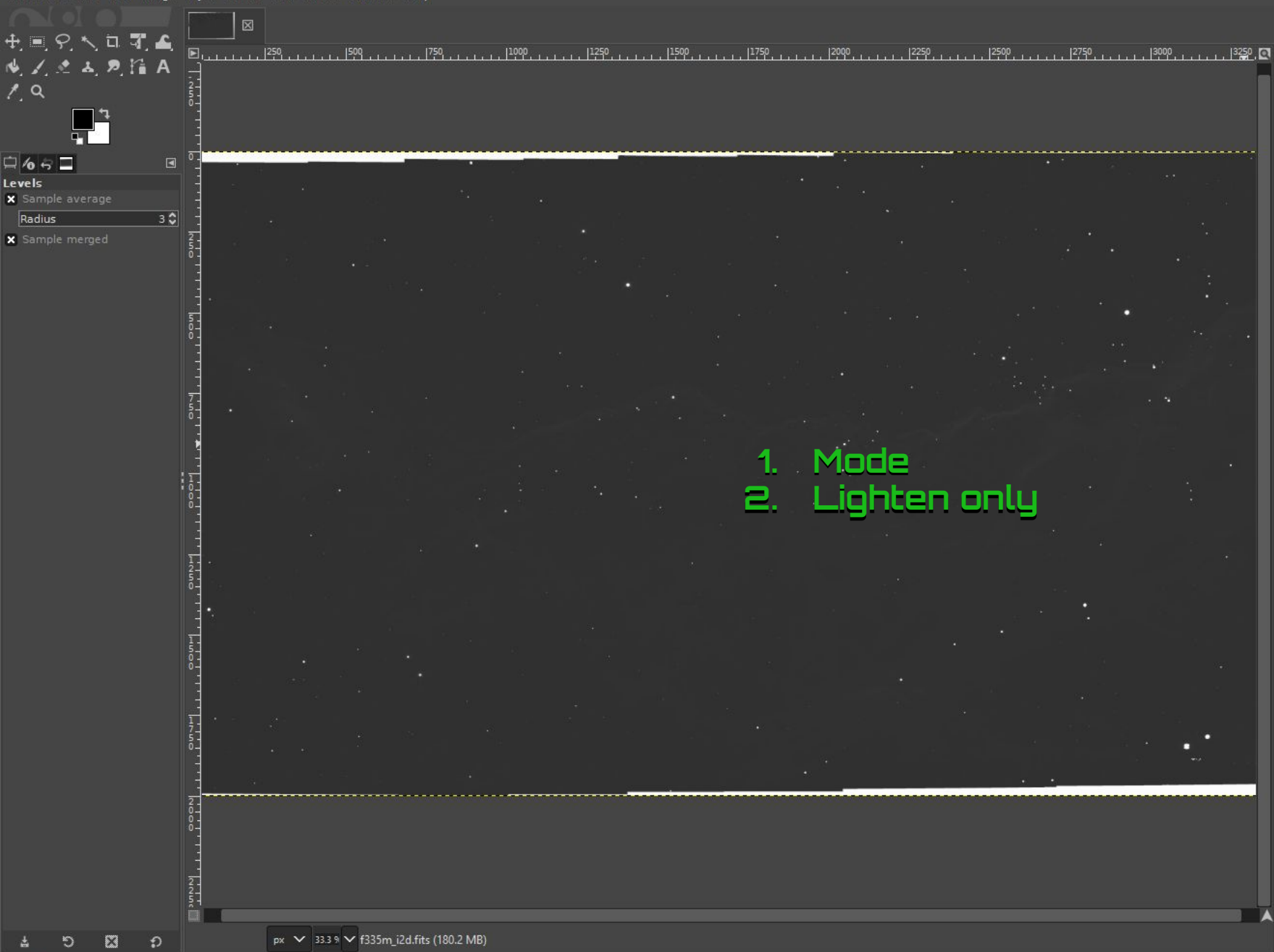


px 33.3% f335m_i2d.fits (180.2 MB)



Search

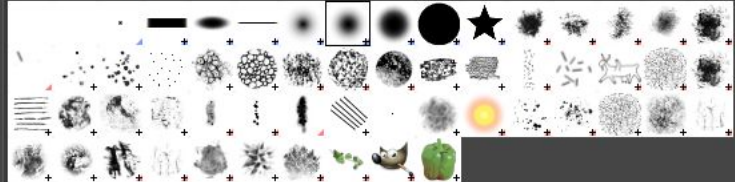




1. Mode
2. Lighten only

filter

2. Hardness 050 (51 x 51)



Basic.

Spacing

10.0

Layers

Channels Paths

Mode

Normal

Normal

Dissolve

Color erase

Erase

Merge

Split

Lighten only

Luma/Luminance lighten only

Screen

Dodge

Addition

Darken only

Luma/Luminance darken only

Multiply

Burn

Linear burn

Overlay

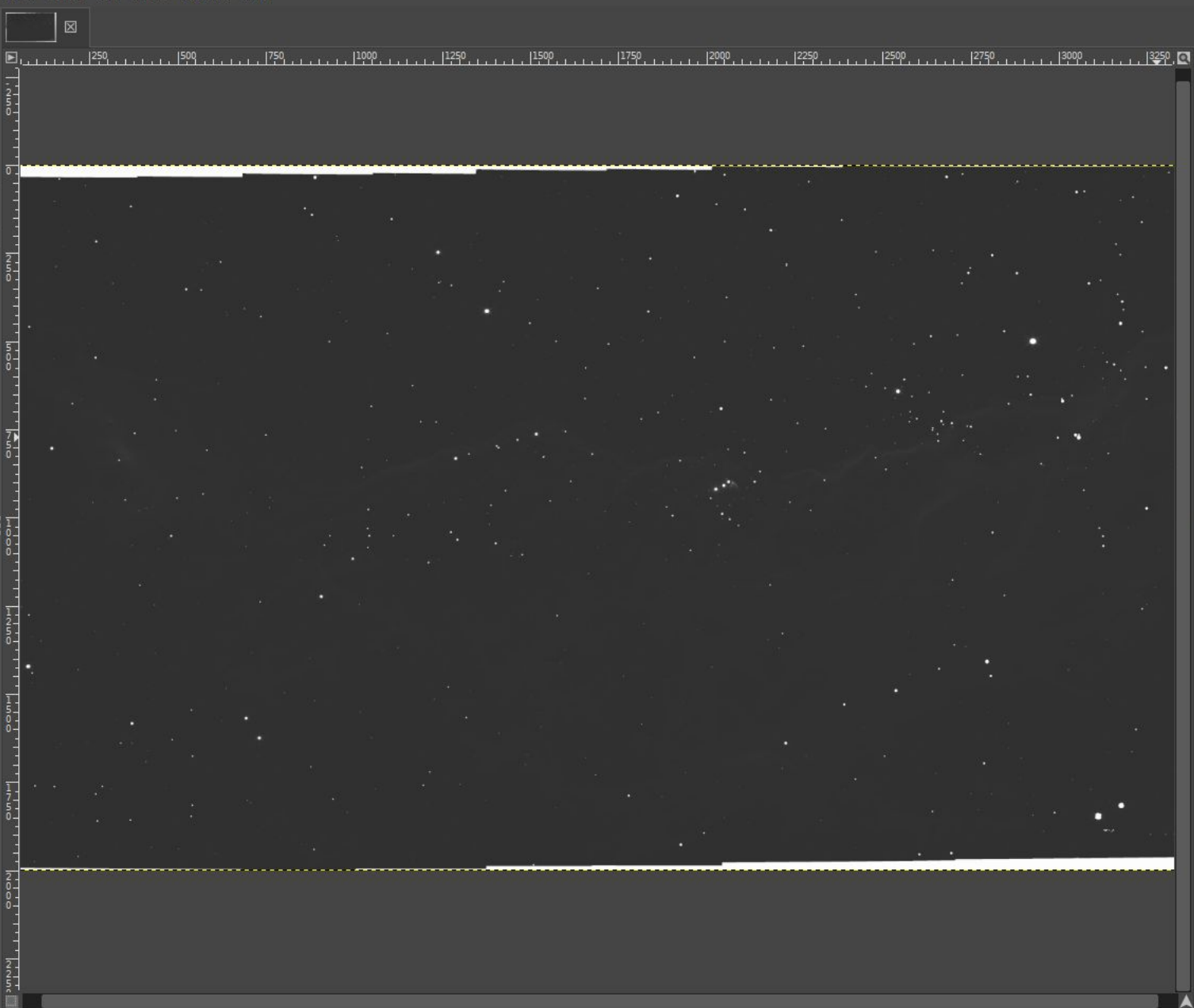
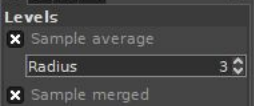
Soft light

Hard light

Vivid light

Pin light

Linear light



Brushes Patterns Fonts Document History

filter

2. Hardness 050 (51 x 51)

Basic.

Spacing 10.0

Layers Channels Paths

Mode Lighten only

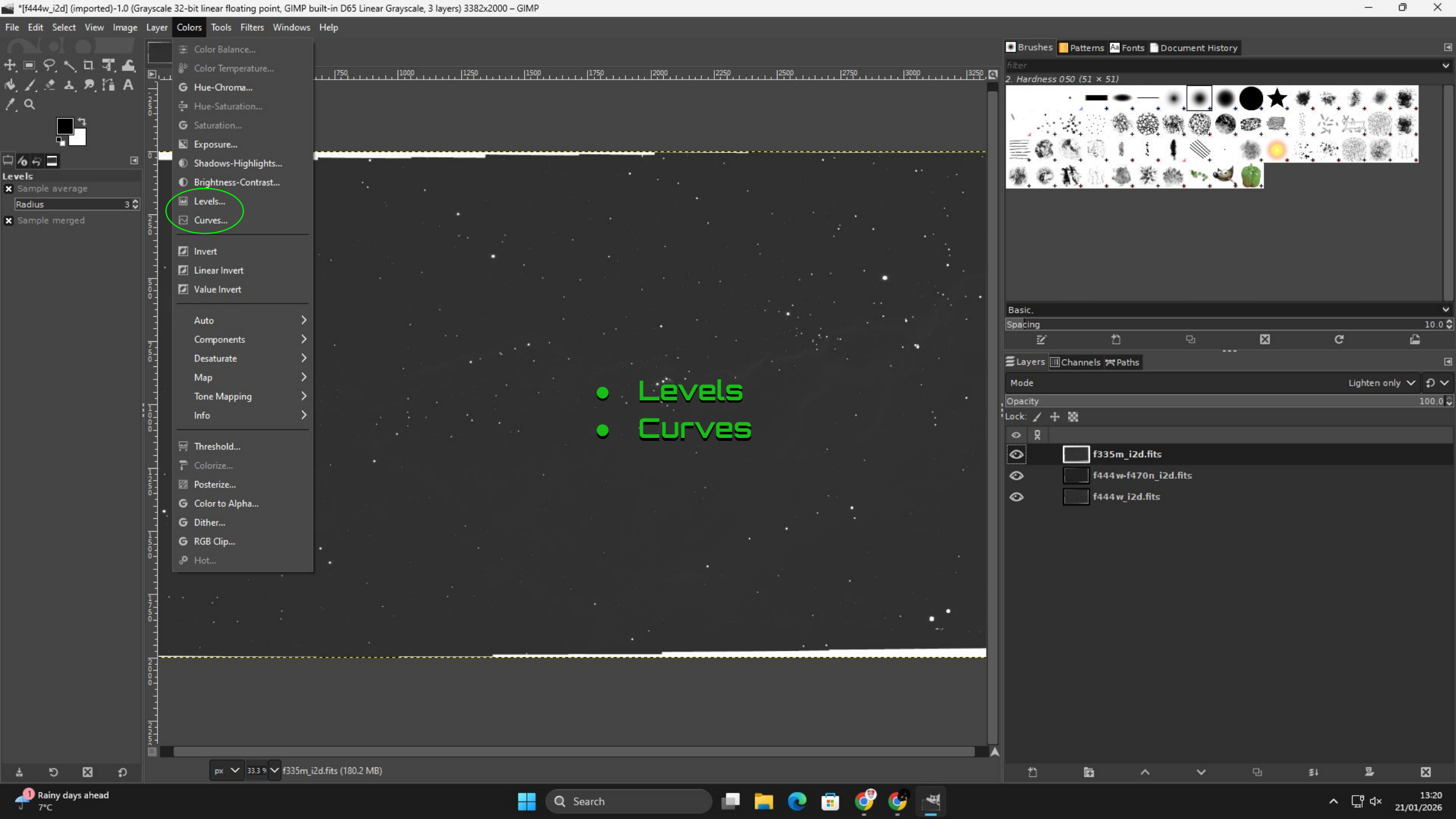
Opacity 100.0

Lock: / +

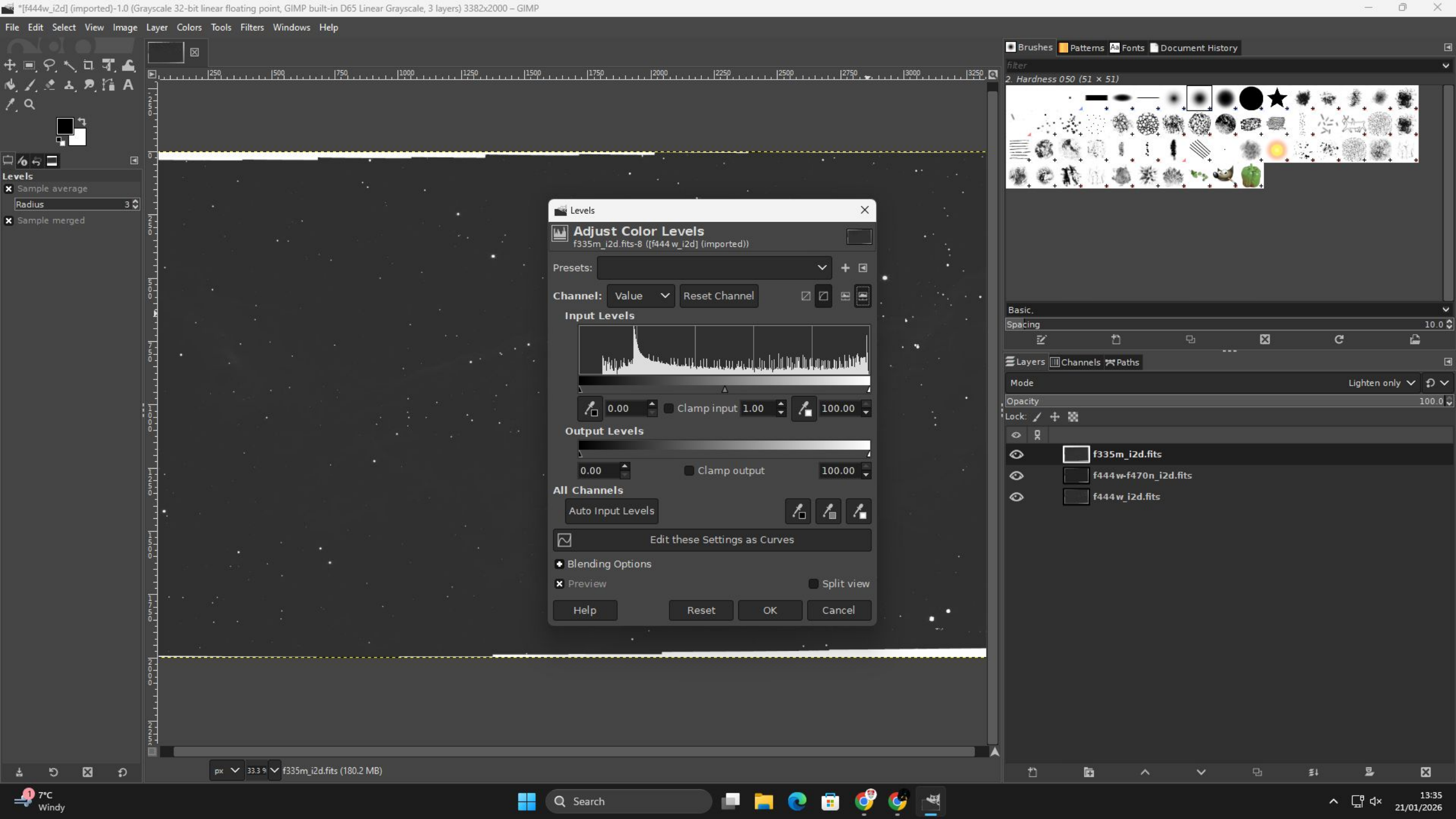
- f335m_i2d.fits
- f444w-f470n_i2d.fits
- f444w_i2d.fits

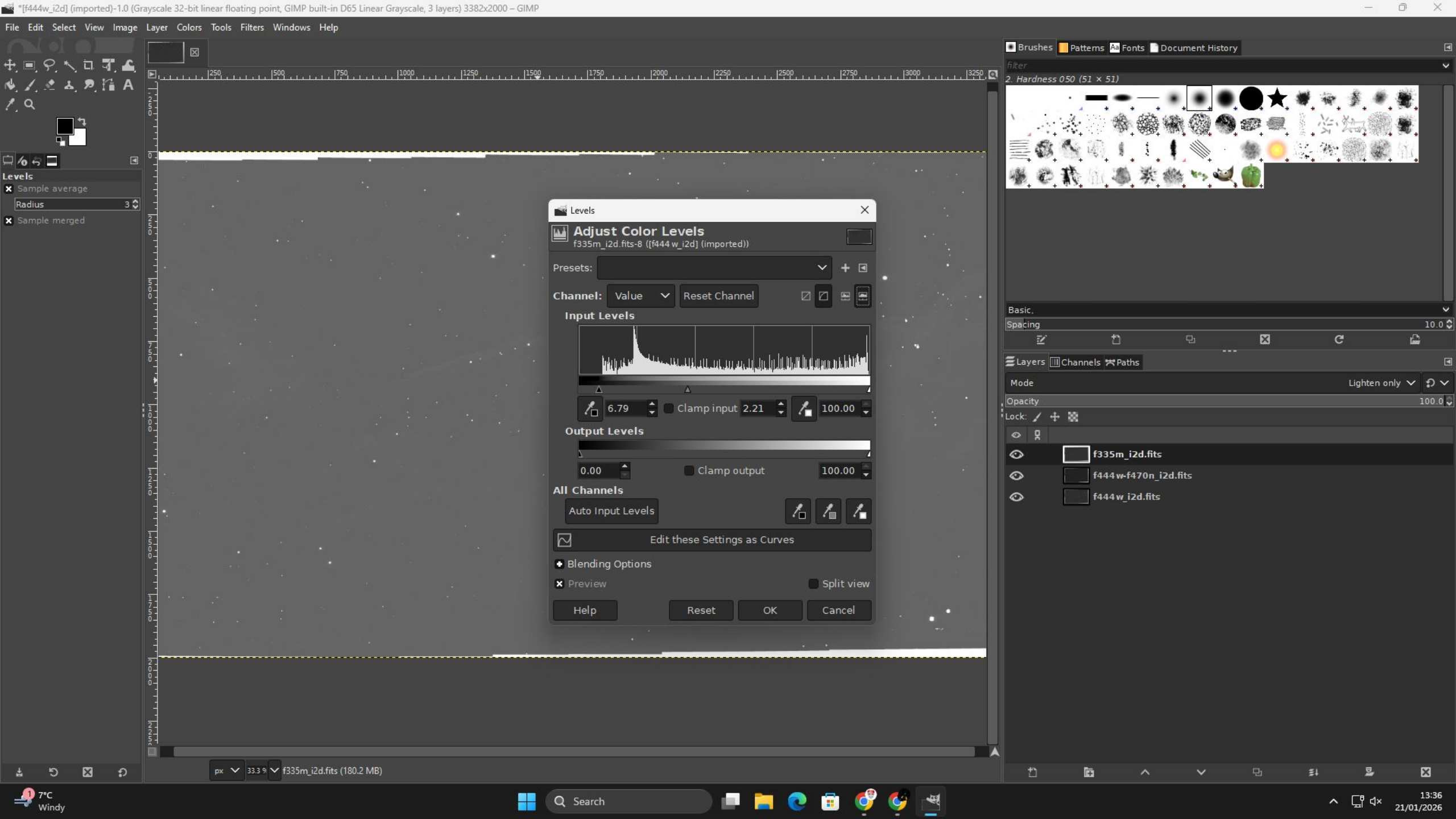


px 33.3 % f335m_i2d.fits (180.2 MB)



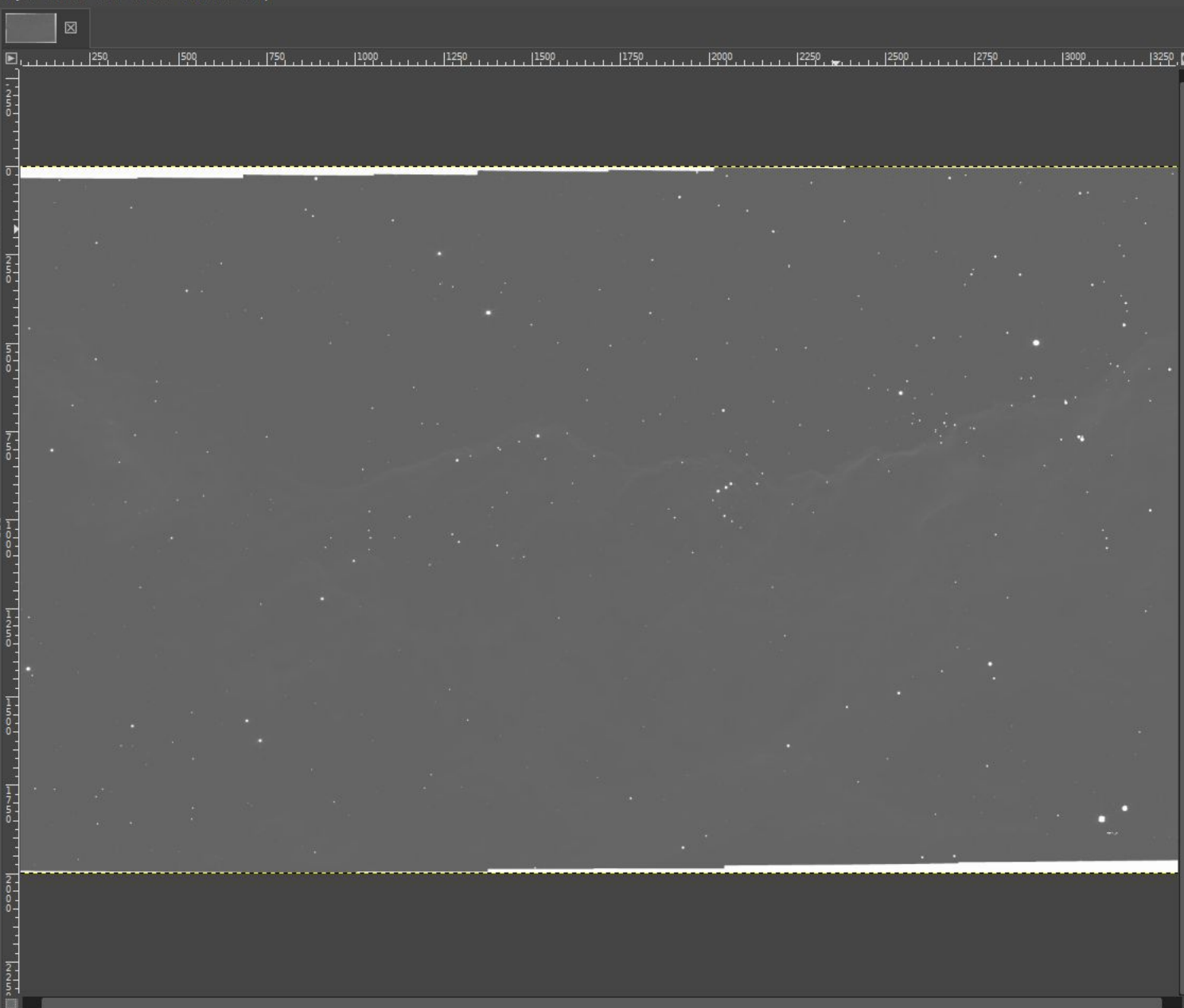
- Levels
- Curves







Curves
x Sample average
Radius 3
x Sample merged



2358, 177

px 33.3 %

Click to locate on curve (try Shift: add control point, Ctrl: add control points to all channels)

Brushes Patterns Fonts Document History

filter
2 Hardness 050 (51 x 51)

Curves

Adjust Color Curves
f335m_i2d.fits-8 ([f444 w_i2d] (imported))

Presets: [dropdown] + [icon]

Channel: Value [dropdown] Reset Channel [checkbox] [checkbox] [checkbox] [checkbox]

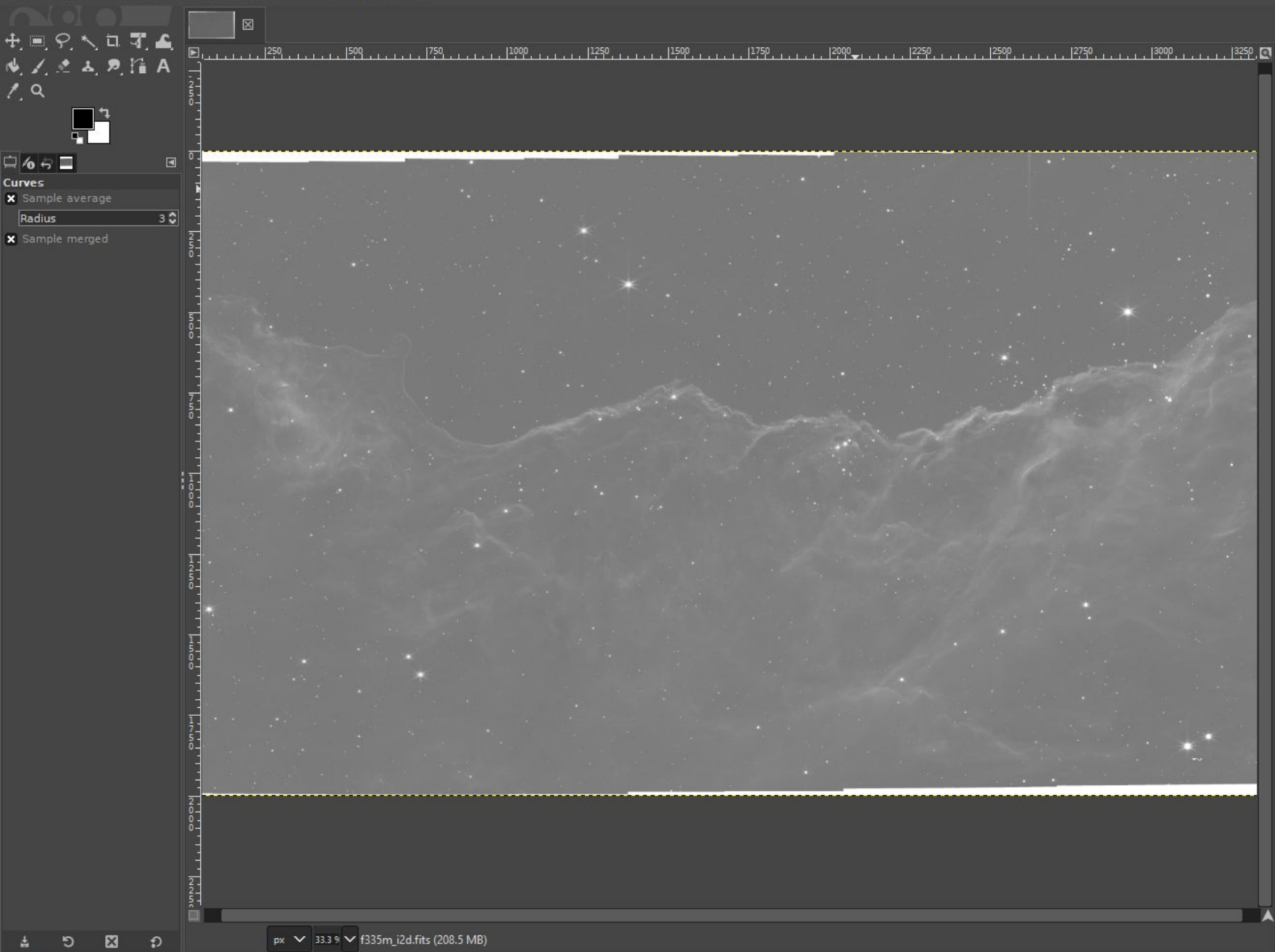
Input: 0.00 Output: 0.00 Type: [radio] [radio]

Curve type: Smooth [dropdown]

+ Blending Options

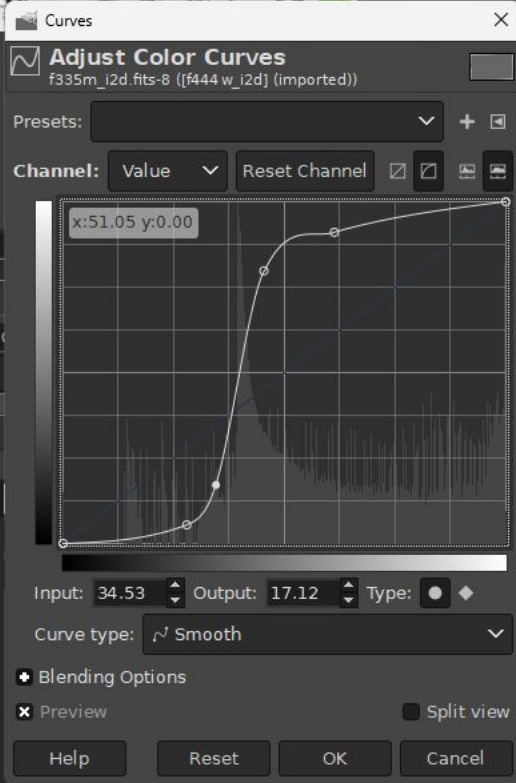
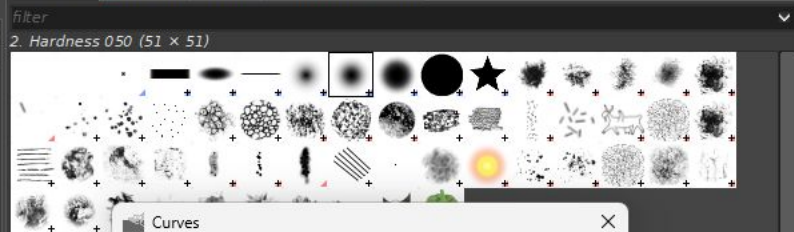
x Preview [checkbox] Split view [checkbox]

Help Reset OK Cancel



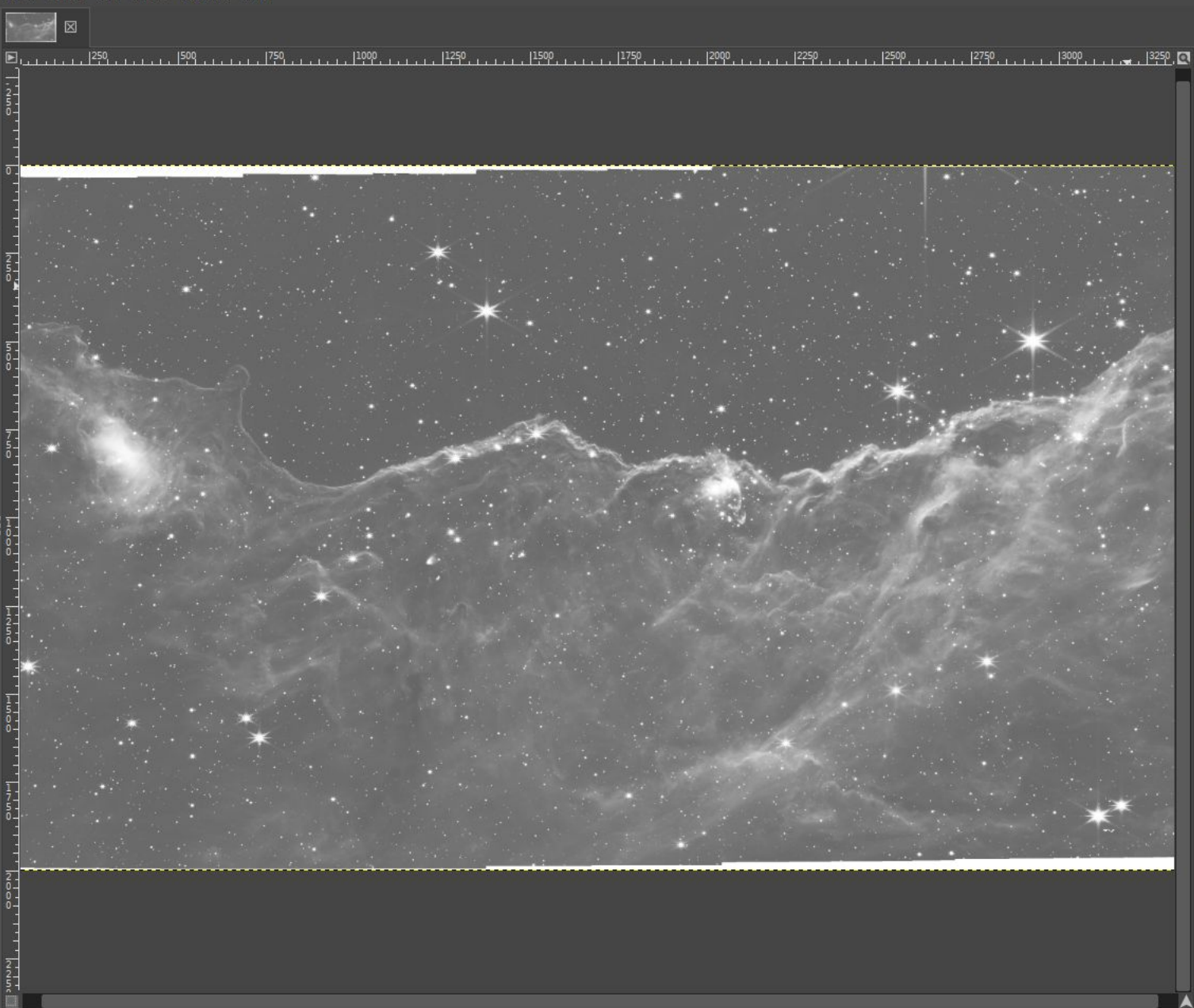
Curves
x Sample average
Radius 3
x Sample merged

Brushes Patterns Fonts Document History





Curves
X Sample average
Radius 3
X Sample merged



Brushes Patterns Fonts Document History

filter

2. Hardness 050 (51 x 51)

Basic.
Spacing 10.0

Layers Channels Paths

Mode Lighten only

Opacity 100.0

Lock: / +

- f335m_i2d.fits
- f444w-f470n_i2d.fits
- f444w_i2d.fits



px 33.3% f335m_i2d.fits (491.6 MB)

Mode **Ctrl+D**

- Precision
- Color Management
- Transform
- Canvas Size...
- Fit Canvas to Layers
- Fit Canvas to Selection
- Print Size...
- Scale Image...
- Crop to Selection
- Crop to Content
- Slice Using Guides
- Zealous Crop
- Merge Visible Layers... **Ctrl+M**
- Flatten Image
- Align Visible Layers...
- Guides
- Configure Grid...
- Image Properties **Alt+Return**
- Metadata

RGB

Grayscale
Indexed
Convert the image to the RGB colorspace
Press F1 for more help

1. Mode
2. RGB

filter

2. Hardness 050 (51 x 51)

Basic.

Spacing 10.0

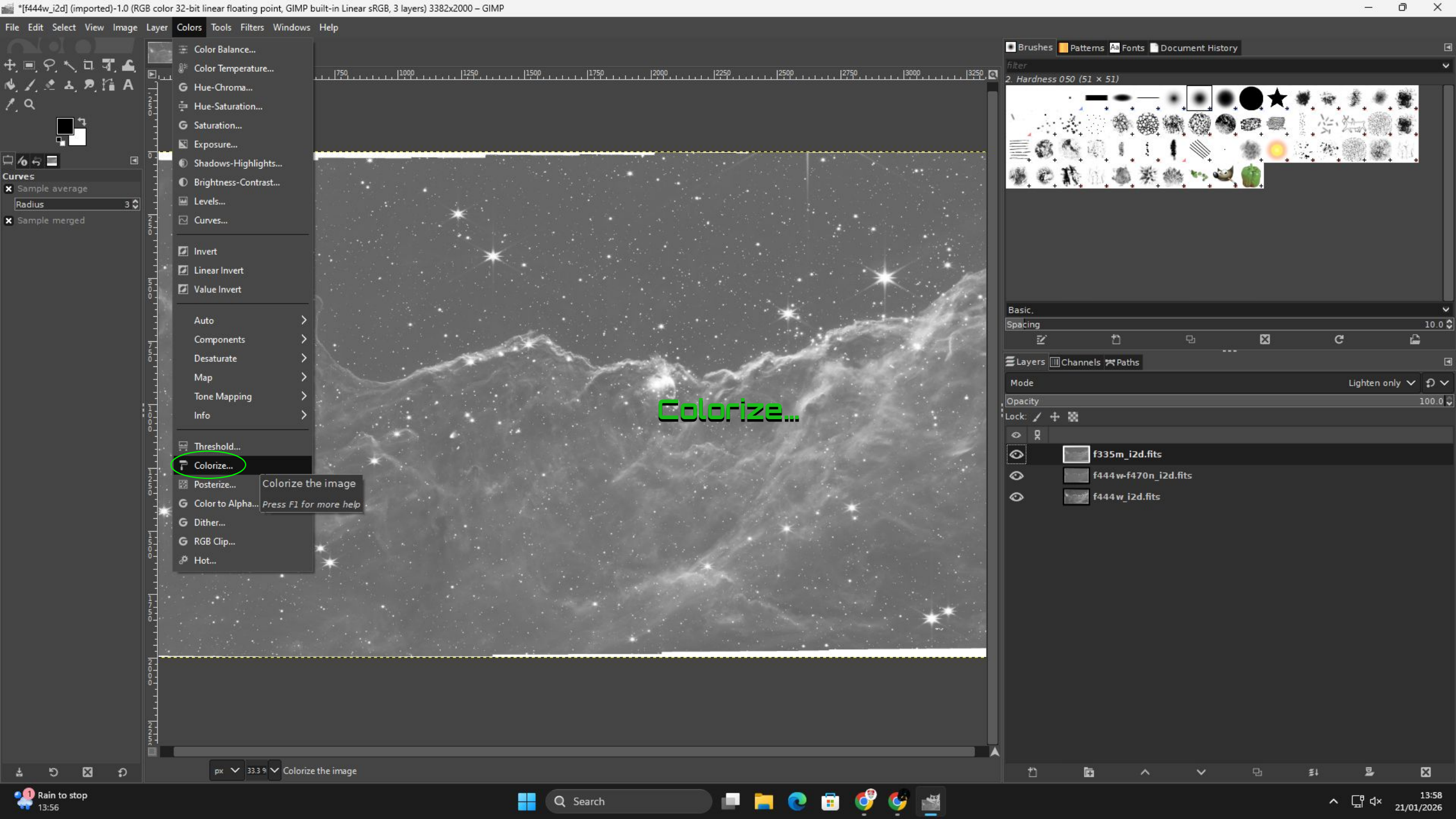
Layers Channels Paths

Mode Lighten only

Opacity 100.0

Lock: / +

- f335m_i2d.fits
- f444w-f470n_i2d.fits
- f444w_i2d.fits





Results

Long Wavelength

F385M

F444W

F470N

Short Wavelength

F187N

F090W

F200W

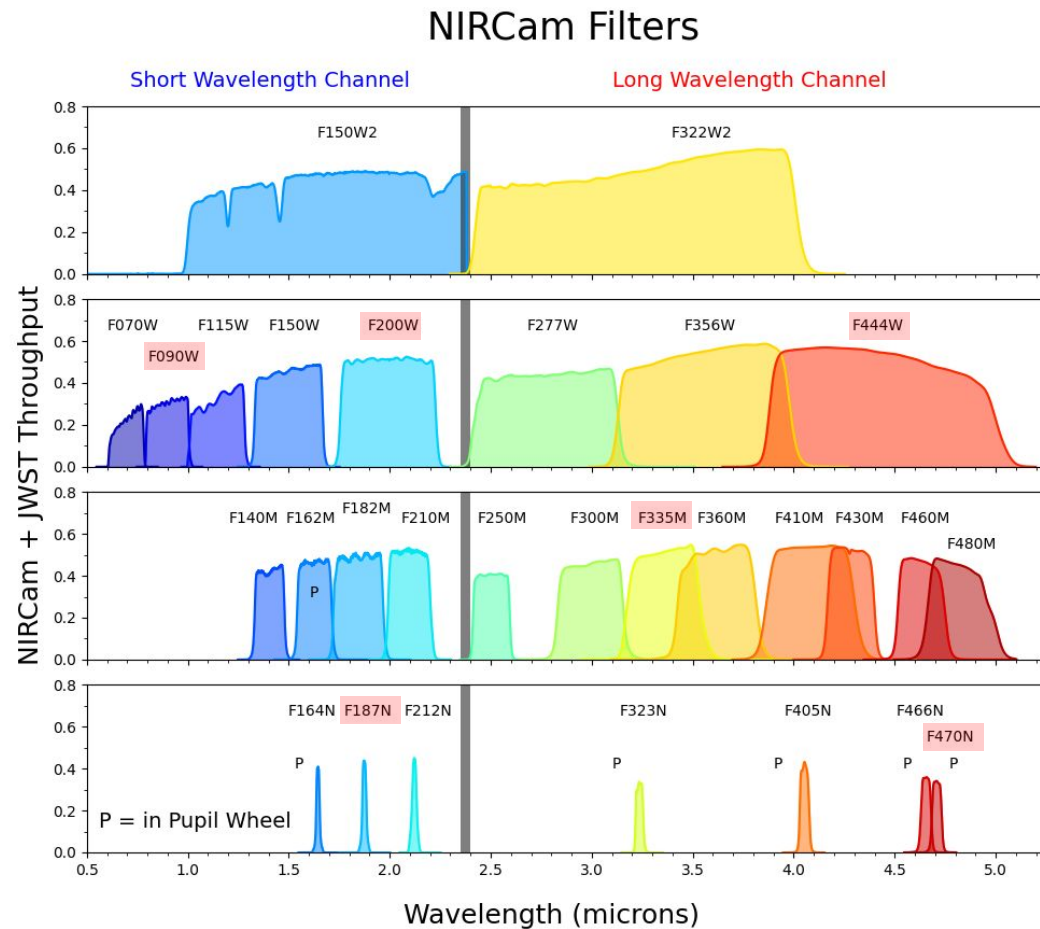
Combination





Advanced

JWST NIRCam Documentation



- F090W
- F187N
- F200W
- F335M
- F444W
- F444W-F470N

<https://jwst-docs.stsci.edu/jwst-near-infrared-camera>

REGISTRATION IN SIRIL



Get MAST screenshots, read JWST bayer documentation
Add GIMP tutorial