

NASA JPL NITARP

NITARP Workshop: Astronomical Imaging

January 4, 2020
prepared by
 Varoujan Gorjian
 NITARP Scientist

NASA JPL NITARP **Images in talks and posters**

- Many posters and talks will have astronomical images
- Some will be in color and some will be in black and white
- This is what you should know about those images:

VG

NASA JPL NITARP **What is an image?**

- There is nothing unique about an astronomical image
- All images on film or on an electronic detector are a recording of different brightnesses of light
- There is/has never been a color photograph. All present color images, whether taken by your digital camera or from Hubble, are a combination of several black and white images.
- So what is a black and white image?

VG

NASA JPL NITARP **What is a Black and White Image?**

1.0	1.3	1.2	1.2	0.9
0.8	4.3	4.0	3.8	0.7
1.1	3.7	6	4.1	1.5
0.9	4.2	4.3	3.9	1.0
1.2	1.4	1.1	0.8	1.3

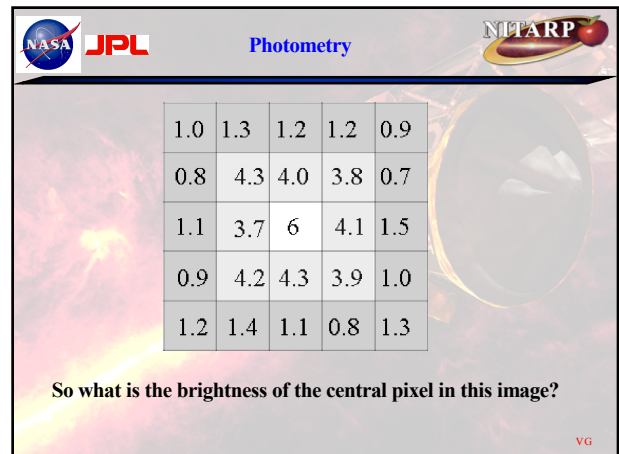
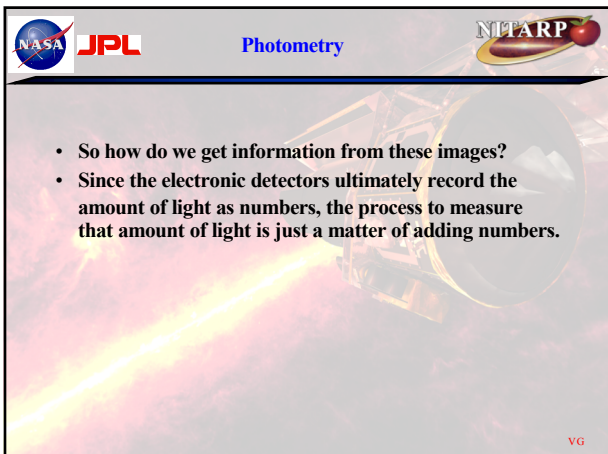
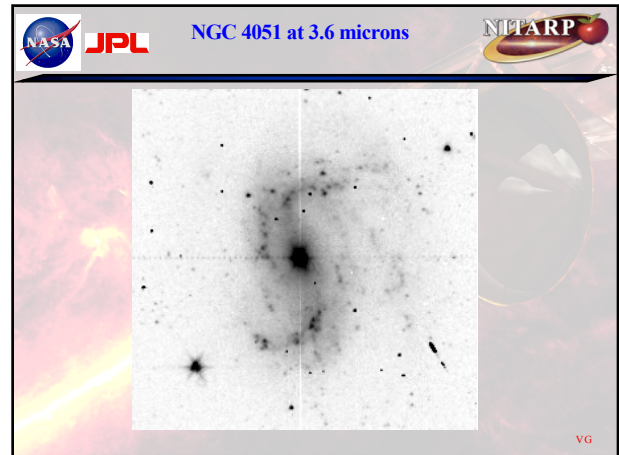
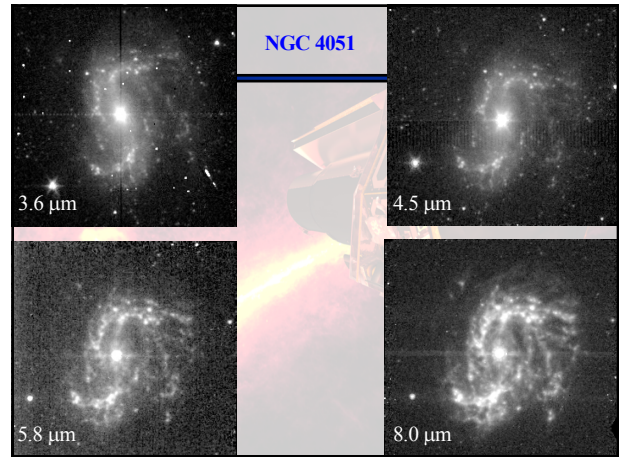
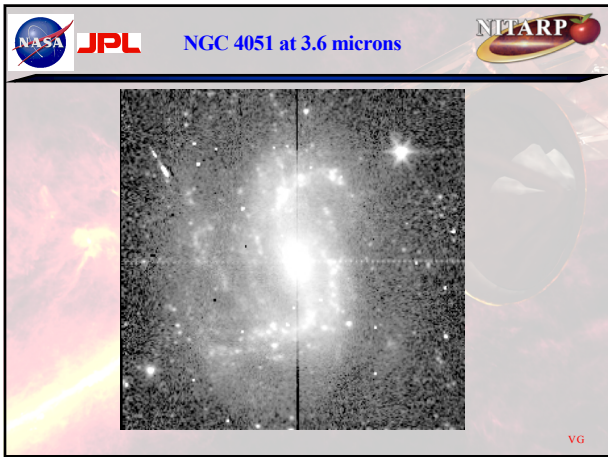
VG

NASA JPL NITARP **NGC 4051 at 3.6 microns**

VG

NASA JPL NITARP **NGC 4051 at 3.6 microns**

VG



NASA JPL Photometry NITARP

1.0	1.3	1.2	1.2	0.9
0.8	4.3	4.0	3.8	0.7
1.1	3.7	6	4.1	1.5
0.9	4.2	4.3	3.9	1.0
1.2	1.4	1.1	0.8	1.3

Well the amount of light recorded made for 6 units. But is that an actual physical measurement?

VG

NASA JPL Photometry NITARP

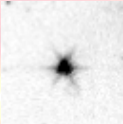
1.0	1.3	1.2	1.2	0.9
0.8	4.3	4.0	3.8	0.7
1.1	3.7	6	4.1	1.5
0.9	4.2	4.3	3.9	1.0
1.2	1.4	1.1	0.8	1.3

Well the amount of light recorded made for 6 units. But is that an actual physical measurement? NO!

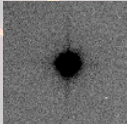
VG

NASA JPL Point Spread Functions NITARP

- Any optical system has a finite limit to how small an image it can generate. That is how the optics and the atmosphere spread out the light from a point hence the name Point Spread Function or PSF.



Spitzer PSF

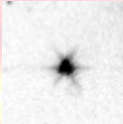


Typical Ground Based PSF

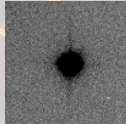
VG

NASA JPL Noise and Background NITARP

- Also any image is the sum of the light from what you are imaging combined with noise from your detectors as well as light which is not from your object: sky, telescope, etc.



Spitzer PSF



Typical Ground Based PSF

VG

NASA JPL An aside on Images in talks and posters NITARP

- Many posters and talks will have astronomical images
- Some will be in color and some will be in black and white
- Now you have a sense of what astronomical images are in posters and in talks that you will see during the conference

VG

NASA JPL End NITARP

VG