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NASA **JPL** **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
- This is what you should know about those images:

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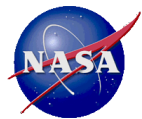
What is an Image



- 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?

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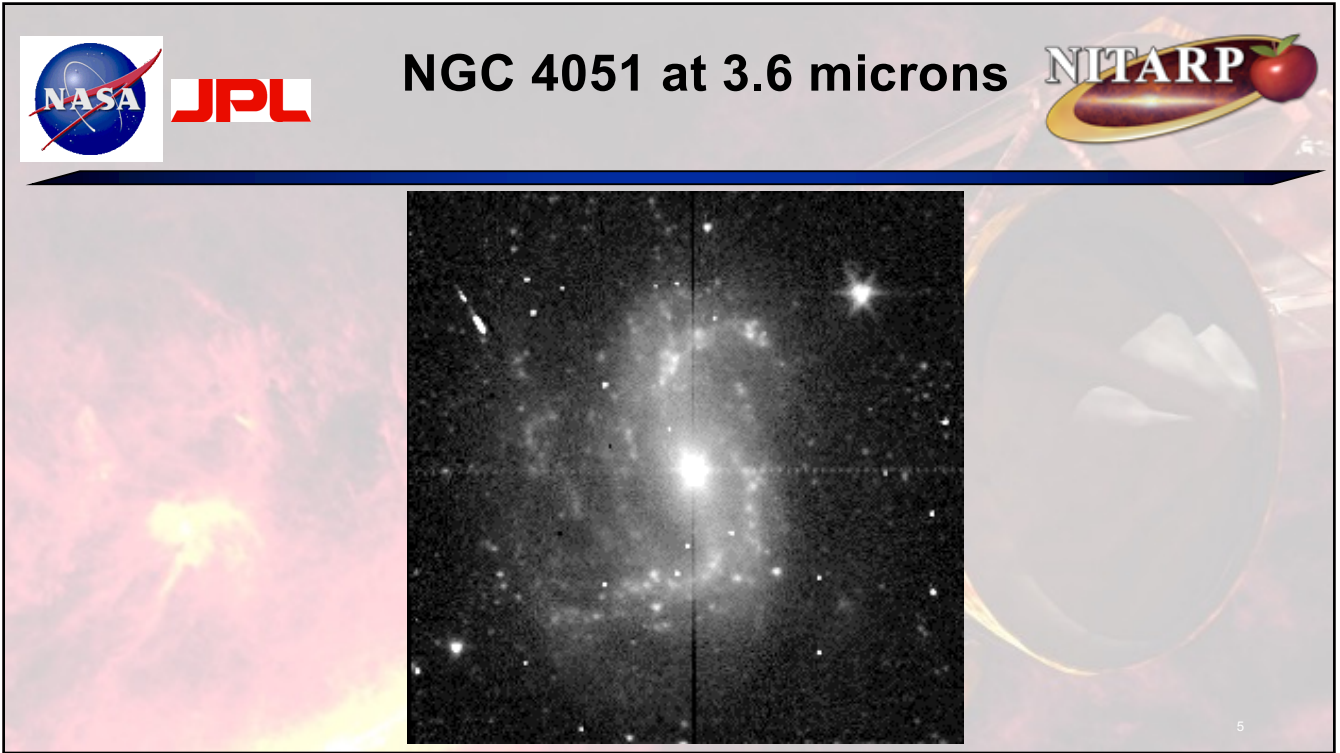
What is a Black and White Image



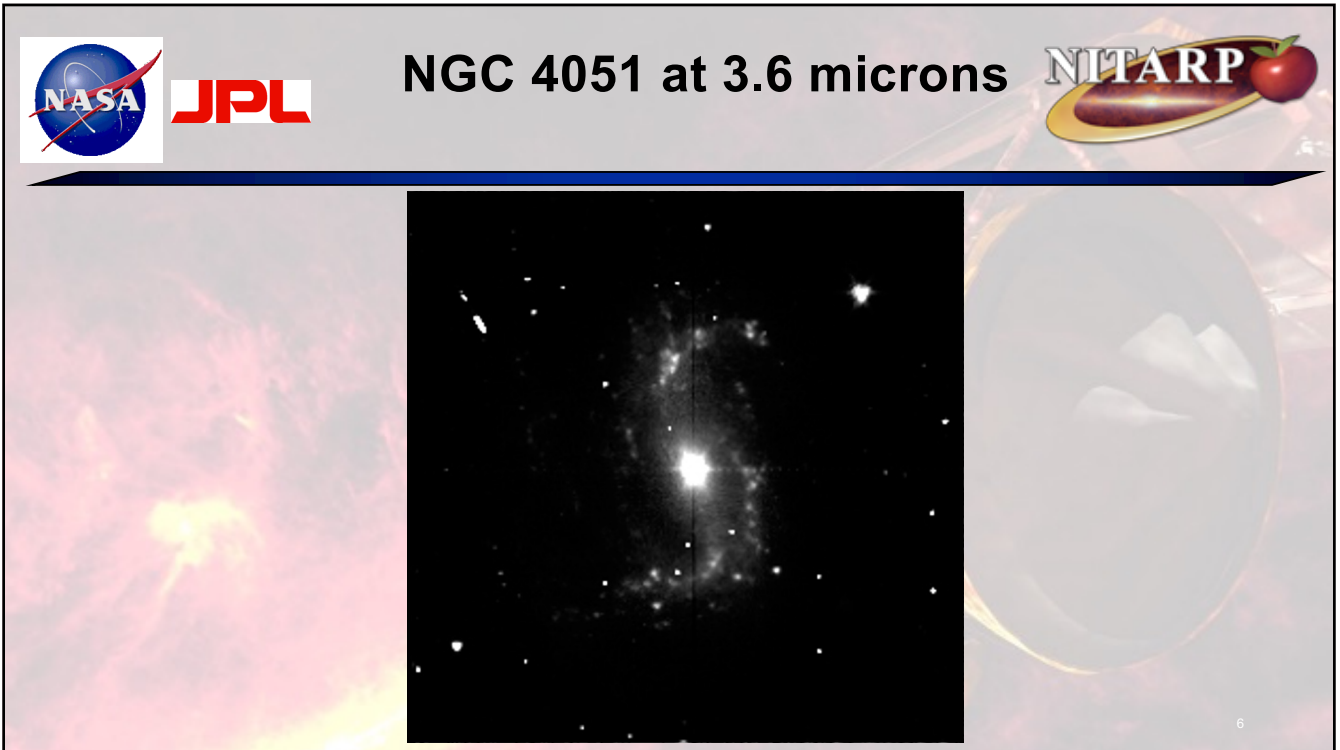
1.0	1.3	1.2	1.2	0.9
0.8	4.3	4.0	3.8	0.7
1.1	3.7	6	4.1	1.5
0.9	4.2	4.3	3.9	1.0
1.2	1.4	1.1	0.8	1.3

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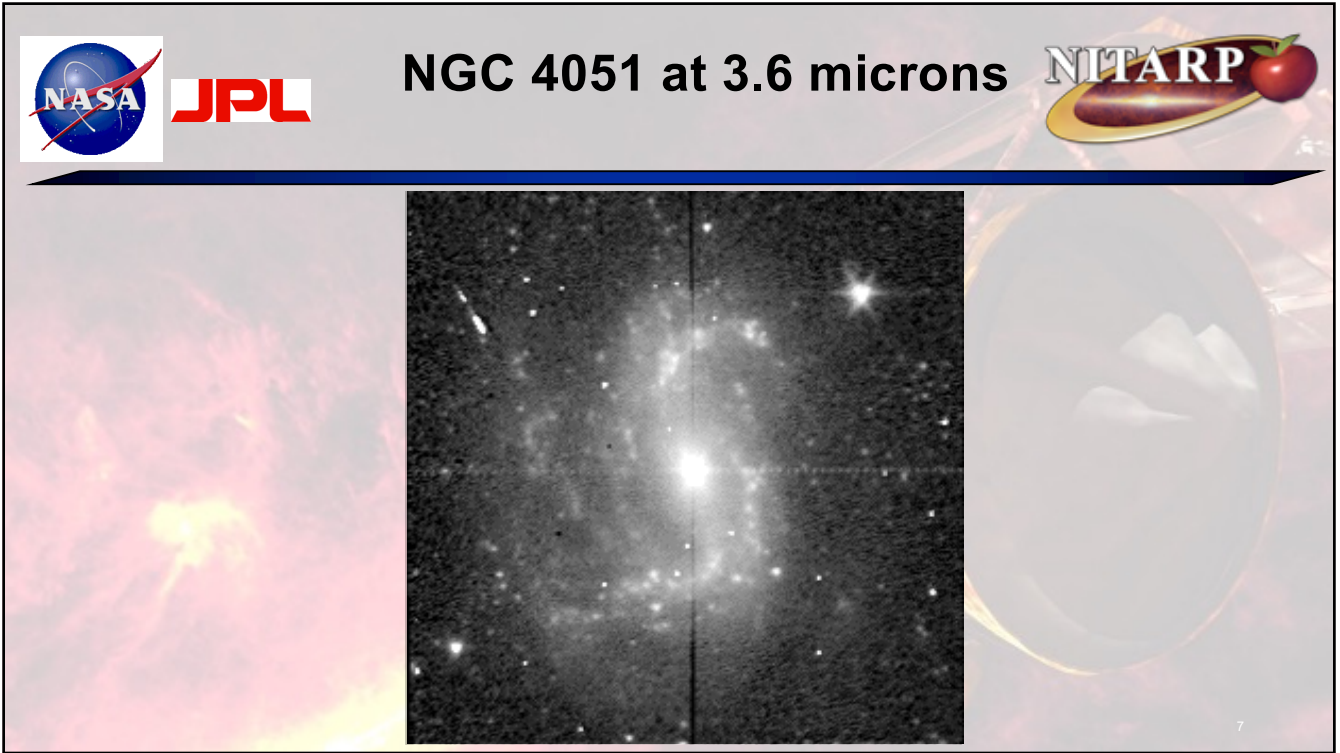
4



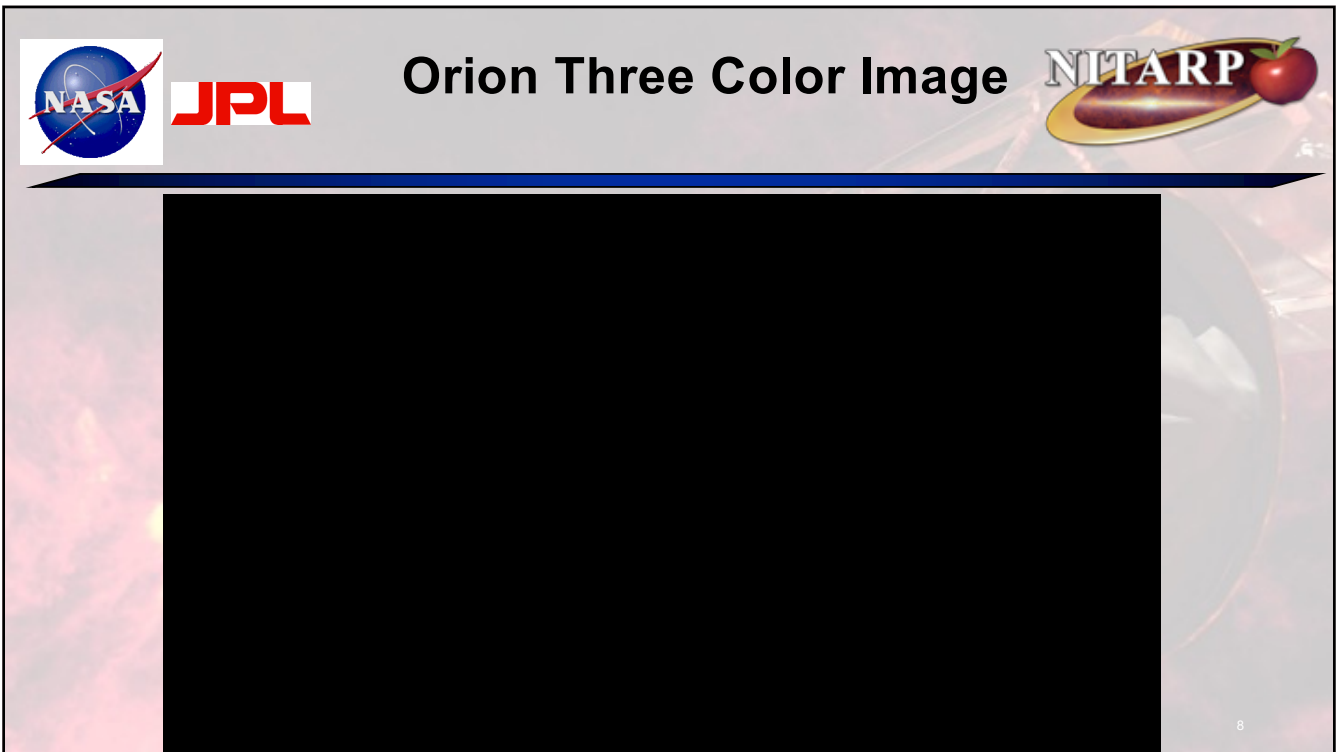
5



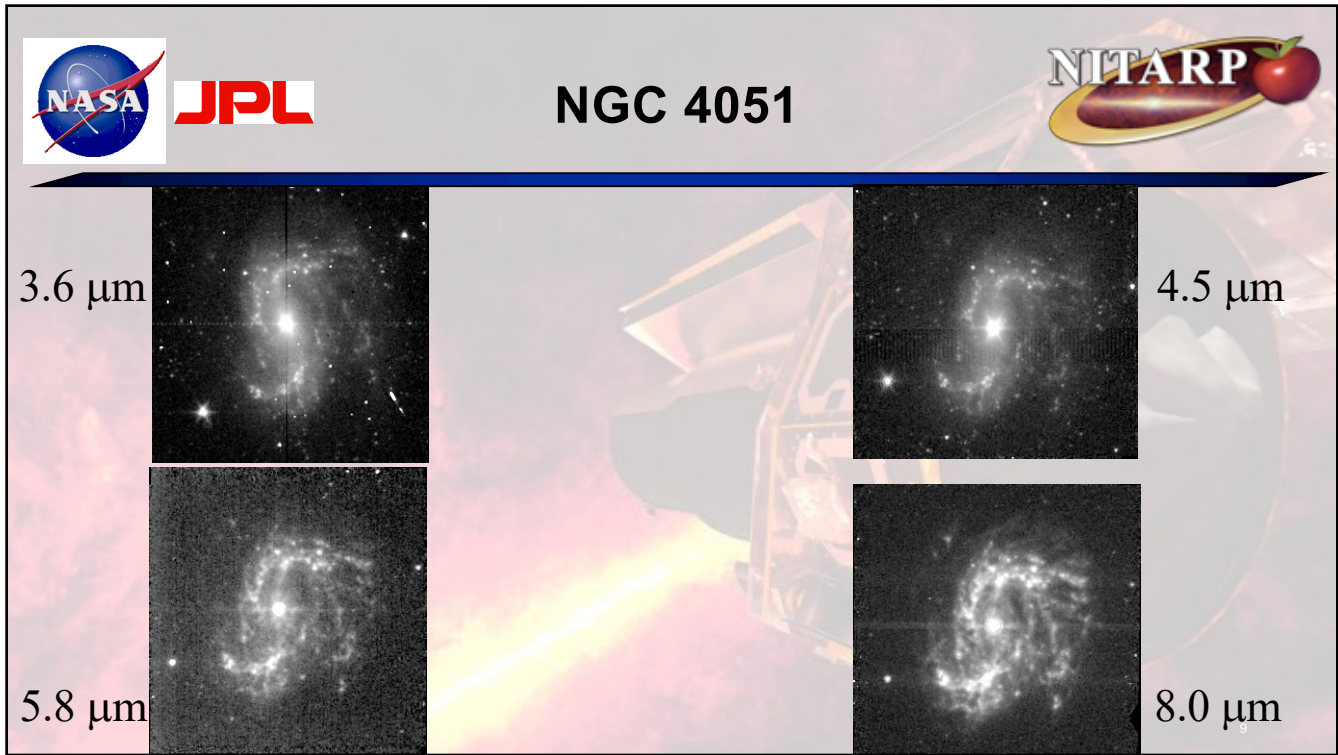
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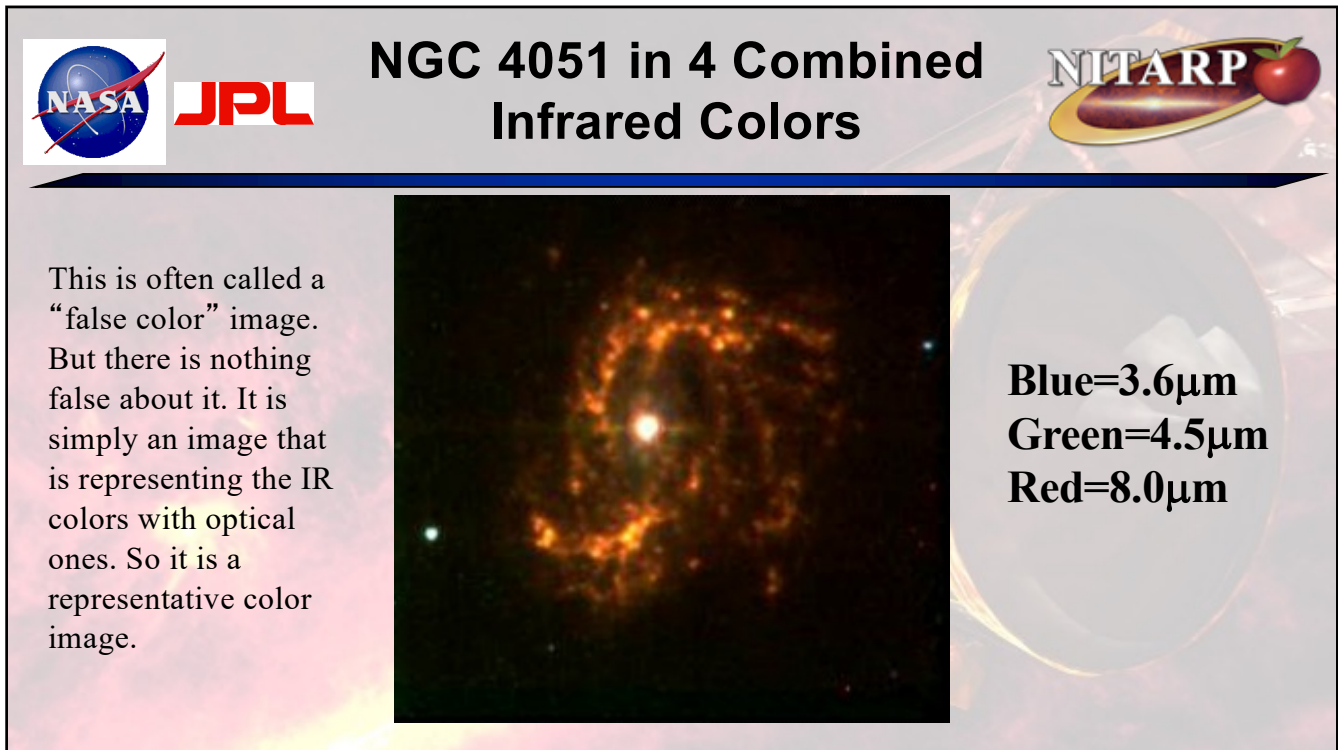
7




8




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Photometry




1.0	1.3	1.2	1.2	0.9
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0.9	4.2	4.3	3.9	1.0
1.2	1.4	1.1	0.8	1.3

So what is the brightness of the central pixel in this image?

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Photometry




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

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

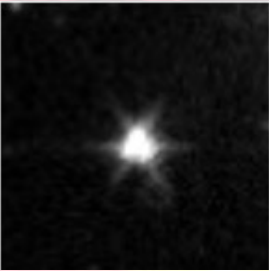
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Point Spread Function



- 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

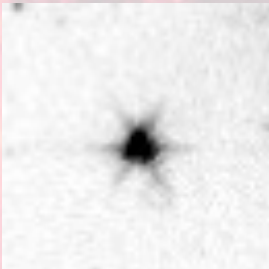
14

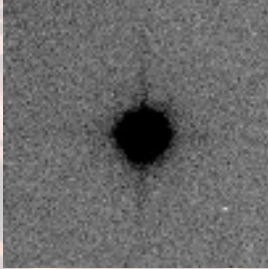
Point Spread Function Inverse Display



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Spitzer PSF




Typical Ground Based PSF

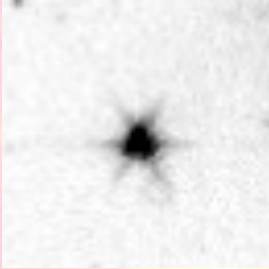
15

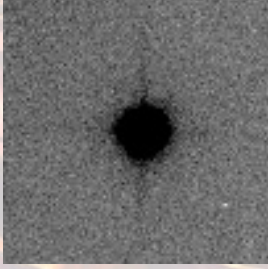
Background Noise



- 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

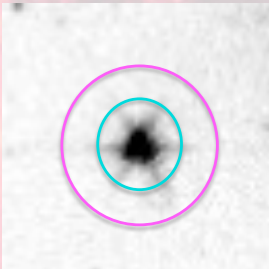
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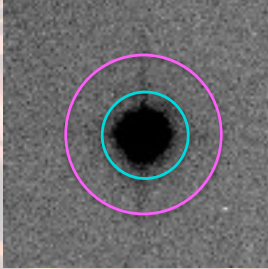
Making Measurements



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Spitzer PSF




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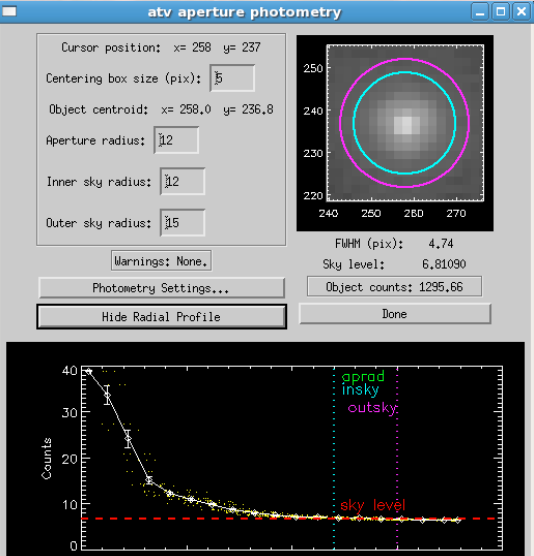
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Making Measurements




The radial profile then tells us how far the PSF extends before we reach the background level of the sky.



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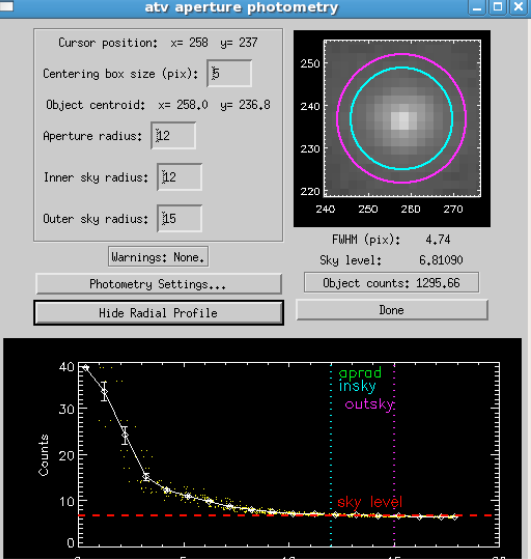



Making Measurements





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1.2	1.4	1.1	0.8	1.3



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What you will See



- Many posters and talks will have astronomical images
- Some will be in color and some will be in black and white
- Most black and white images will be inverted for better clarity
- Now you have a sense of what astronomical images are in posters and in talks that you will see during the conference and what it means to measure an object's brightness

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