

TESTING THE USE OF ADAPTIVE OPTICS TO REVEAL THE AGE OF DISTANT GALAXIES

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Bruzaul and Charlot's Program

Galaxy Background



- The outside is generally blue which indicates young stars.
- The galaxy is red which could mean old or young and dusty.
- The inside is red which could mean old or young and dusty.
- The dust band can be penetrated with Adaptive Optics.

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Galaxy Spectral Evolution Library (GALAXEV)
MILES Version: 03/2009-2009 - C. Bruzual and S. Charlot - All Rights Reserved
Construction mode No. 1
Enter desired wavelength range = [40,400] (default: full range).
o If you want all 8,8,8,8's scaled for flux = FO at lambda0 = 40, enter the
  desired values (default: no scaling)
o If you want the output as Flux vs. lambda0, enter WS with a minus sign.
o If you want all 8,8,8,8's scaled so that FO is the flux measured through
  Filter W at redshift Z, enter W0 = "W"
WS,lambda0,FO,Z = 1000,25000,0.200,1
Enter age of up to 24 red's. Press enter for previous values.
Press in key (generated by some) = -5
Columns written to file: w02_dustg0_n_5000
* Record      130
* Column      2
* Run (or)    1,0000-00
* Lambda0(s)  7100
```

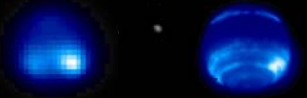
- This program allows the user to choose the dust content, bursts of star life, and how old the galaxy is.
- It then simulates the data from the specifications
- We used these graphs to fit the simulated galaxy against.

Adding Adaptive Optics



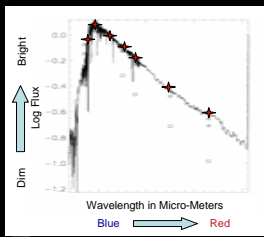
Placed galaxy into a galaxy field to add atmosphere and correct with AO.

Adaptive Optics



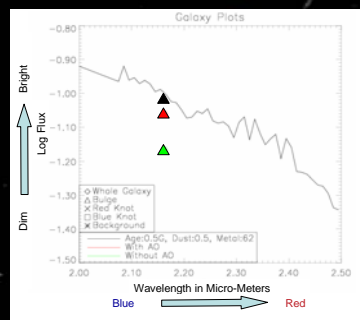
Adaptive Optics is a technology which utilizes a deformable mirror in order to remove the aberrations from an image caused by the atmosphere of the earth.

Normalizing



- In order to plot everything together, each component was normalized.
- To find out the age of the simulated galaxy, we over plotted onto the Bruzaul and Charlot graphs to find a fit.

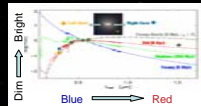
Correction For The Bulge



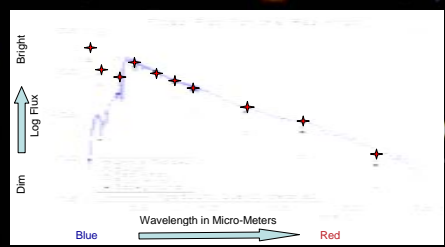
Hubble Space Telescope



- The HST takes high resolution UV and optical images.
- The images give data which can fit different age models for the galaxy.
- A galaxy could look 10 Giga years old and really be 5 Million years old with a high dust content.



Near and Far Ultraviolet



During experimenting with Tau models for star life, the near and far UV proved essential.

Research To Come

- Adding multiple bursts to models for a better fit
- Experiment more with AO correction.

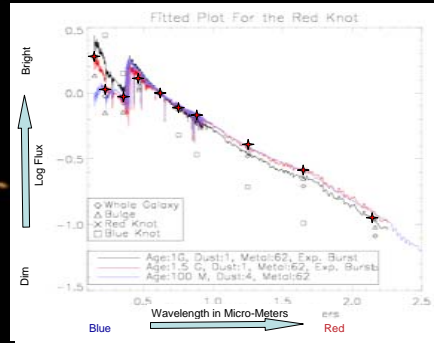
The Missing Wavelength

- The HST resolution in the near infrared is poor.
- Near infrared penetrates through the dust.
- We are able to see individual components of the galaxy.
- Adaptive Optics on large ground-based telescopes allows high resolution in the infrared.

Testing



- We viewed a simulated galaxy and made spectra for each of the filters used.
- We measured four different areas for their flux and wave length.



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