Testing the Use of Adaptive Optics to Reveal the Age of Distant Galaxies

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Until recently, high-resolution imaging studies of distant galaxies have had a missing critical wavelength, the near infrared. The infrared wavelength, compared to optical, is especially valuable because it is able to better penetrate dust and it is more sensitive to old stars. High resolution IR imaging is now possible with Adaptive Optics on large ground based telescopes. In this project, we have the benefit of adding high resolution IR imaging to already existing high-resolution imaging in the optical from the Hubble Space Telescope, for measuring stellar populations and their dust content. Simulated galaxy images spanning twelve different filters from the Ultraviolet to infrared are analyzed. Four sub-components were measured within the simulated galaxy and plotted against model spectra made with the Bruzaul and Charlot (2003) program. These spectra were made with a certain age, dust content, and strength of bursts in order to find the best fit for the regions measured in the simulated galaxy. From these graphs, an estimate of the age and dust content is made. We conclude that the ultraviolet filters are critical in producing accurate age measurements while the infrared filters are critical for dust content. The effects of Earth's atmosphere are added to the simulated IR image to see how well Adaptive Optics allows us to measure the ages and dust contents of the sub-components of the galaxy.