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Spectral resolution is not important for modeling galaxy growth

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ABSTRACT

Key words: galaxies: surveys — galaxies: spectroscopy — spectroscopy: techniques

1 INTRODUCTION

One of the main ambitions of the study of galaxy evolution is to understand how galaxies grow in stellar mass over time. This is done by decomposing galaxies' spectral energy distributions (SEDs) into combinations of stellar populations of different ages. The coefficients that weight each stellar population—which have distinct colors—then represent the amount of stellar mass a galaxy is inferred to have formed at the lookback time that corresponds to that age.

The SEDs of stellar populations are distinct but not orthogonal. As such, there are degeneracies. Obviously, those are compounded by formally age-independent effects from metallicity and dust reddening. To alleviate those degeneracies—especially with respect to metallicity—and increase the contrast of the extant stellar populations, high resolution spectra ($R \sim 1000$s) can be used in addition to sets of broadband colors. The hope in this approach is that the details of absorption lines that are differentially sensitive to age and metallicity might enable more accurate coefficients to be inferred for the amount of mass formed at any given lookback time.

The utility of this approach is testable. For example, spectral decompositions of low spectral resolution SEDs—comprised of photometry or a mix of photometry and $R \lesssim 100s$ spectroscopy—can be modeled to infer a star formation history (SFH), which can in turn be used to produce a prediction of features at quasi-arbitrarily higher spectral resolution. These predictions can be compared to actual high resolution observations to see whether said features add any useful age-sensitive information that might enhance the accuracy of the inferred SFHs.

We carry that experiment out here. Using a set of **XXX**

2 DATA

3 SAMPLE CHARACTERISTICS

4 DISCUSSION

5 SUMMARY

Foo.

Facilities: Magellan/IMACS
Software: IDL (Coyote libraries; http://www.idlcoyote.com/), python (CarPy).

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