MNRAS **000**, 1–1 (2020) Preprint 11 March 2020 Compiled using MNRAS LaTeX style file v3.0

Spectral resolution is not important for modeling galaxy growth

Louis E. Abramson[1]★ and Daniel D. Kelson[1]

[1] *Carnegie Observatories, 813 Santa Barbara Street, Pasadena, CA 91101, USA*

Accepted XXX. Received YYY; in original form ZZZ

ABSTRACT

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

1 INTRODUCTION

A central ambition of the study of galaxy evolution is understanding stellar mass growth; i.e., galaxy star formation histories (SFHs). Spectral energy distributions (SEDs) are the key data in this work because they can be decomposed into combinations of distinct stellar populations of known ages. The resulting coefficients yield the amount of stellar mass a galaxy is inferred to have formed at the lookback time corresponding to each population's age.

Stellar populations have different but not orthogonal SEDs. As such, the above decompositions are usually degenerate. Such degeneracies are compounded by age-independent effects like metallicity and dust reddening.

To alleviate those degeneracies, high resolution spectra ($R \sim$ 1000s) are often used in addition to galaxy broadband colors in the model fitting. The hope is that the details of absorption lines will potentially increase the contrast between stellar subpopulations, constrain metallicity, and so yield more accurate age/mass coefficients. The utility of these data is usually taken as axiomatic, but it is also readily testable.

This paper presents an experiment that shows there is very little information in high resolution spectra that enhance constraints on galaxy SFHs compared to inferences based on a combination of photometry and very low resolution ($R \lesssim$ 100s) prism spectra.[1] We perform this experiment by using precomputed SFH inferences based on low resolution SEDs for a set of **XXX** systems at $\langle z \rangle =$ **ZZZ** to produce predictions of each galaxy's high-resolution spectrum, and comparing these predictions to actual high resolution observations taken post-facto. With the exception of the Balmer lines—whose divergence from predictions is readily ascribable to emission line infilling—we find differences to be of order **whatever they are**, suggesting **whatever we say they do**.

Throughout, we use AB magnitudes and assume $(H_0, \Omega_M, \Omega_\Lambda) = (70\ \mathrm{km\ s^{-1}\ Mpc^{-1}}, 0.3, 0.7)$.

2 DATA

3 SAMPLE CHARACTERISTICS

4 DISCUSSION

5 SUMMARY

Foo.

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

ACKNOWLEDGEMENTS

This paper has been typeset from a TeX/LaTeX file prepared by the author.

★ E-mail: labramson@carnegiescience.edu

[1] A future paper will extend this statement to photometry based inferences alone.