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Exploring the Assumptions and Limitations of Spectral Energy Distribution Fitting in Galaxies

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Spectral Energy Distribution fitting is a technique that forms the backbone for much of extragalactic analysis. From the vast samples of galaxies in modern galaxy redshift surveys, to the highest redshift galaxies from JWST, SED fitting is our best mechanism by which to derive properties like mass, star formation, and age of these galaxies.

The more we push these techniques, either in trying to derive more detailed properties like star formation histories and quenching timescales, or deriving properties for galaxies beyond cosmic noon, the more susceptible we are to falling prey to the assumptions and limitations that are baked into these techniques.

I will present a detailed analysis that compared the derived properties of low-redshift galaxies using a myriad of different stellar population libraries (and modifications to the ingredients that go into them) to characterise the consequences of our most common assumptions. This will include a discussion of the possible impacts of loosening these assumptions, such as allowing an evolution of metallicity, and even an evolution of the IMF.

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