Cosmic evolution of metallicity using the SED-fitting code ProSpect

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Abstract

SED-fitting techniques, which use multi-wavelength photometry from galaxies in the low-z Universe to infer their SFHs, are becoming an increasingly popular tool to generate the cosmic SFH, an essential ingredient in the build-up of galaxies. Up until now, however, these techniques have not implemented an evolution in the metallicity of individual galaxies. In this talk, I will present results using a new SED-fitting code ProSpect, considering a closed-box metallicity evolution, to derive star formation histories of _˜7,000 z< 0.06 galaxies from the GAMA survey. By implementing a physically-motivated metallicity evolution for individual galaxies, we recover not only the observed cosmic SFH, but we can also extract the cosmic evolution in metallicity. I will show that this implementation has provided a marked improvement when compared with the results of other SED-fitting techniques, and that we are able to recover a realistic evolution of gas-phase metallicity within our sample. As I will show in this talk, this enables us to predict the evolution of the mass-metallicity relation to high-z, and to low stellar masses. Finally, I will also show the resulting cosmic metal mass density derived by this work, and how it relates to observational measurements.

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