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PAH LINES AT HIGH REDSHIFT AS GALAXY EVOLUTION MARKER

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Based in chemodynamical models for galaxy evolution, we studied the formation of PAH lines at high redshifts. The model considers carbon and silicon grains, and also PAH molecules. It distinguishes diffuse ISM the molecular clouds associated to star forming regions. The PAH lines provide a good signature of the evolutionary stage of galaxies, star formation rate, in addition to allowing the assessment the relative importance for of AGN and stellar emission on the output of the galaxy. In particular, the line ratio $11.3/7.7 \mu\text{m}$ is a good marker of the age of high redshift galaxies. We expected that our calculations provide some benchmarks both for future observations both with ground and satellite instruments. The ages derived in this way for high redshift objects could be used to test dark energy models. In addition to the cosmological applications, the observations of the PAH features could be used to check the charge state of PAHs. Apparently, anions and neutrals are favored over cations.

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THE MASS–METALLICITY–STAR FORMATION RATE RELATION UNDER THE STARLIGHT MICROSCOPE

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The correlation between stellar mass and gas-phase oxygen abundance (M – Z relation) has been known for decades. The slope and scatter of this trend is strongly dependent on galaxy evolution: Chemical enrichment in a galaxy is driven by its star formation history, which in turn depends on its secular evolution and interaction with other galaxies and intergalactic gas. In last couple of years, the M – Z

relation has been studied as a function of a third parameter: the recent star formation rate (SFR) as calibrated by the $\text{H}\alpha$ luminosity, which traces stars formed in the last 10 Myr. This mass–metallicity–SFR relation has been reported to be very tight. This result puts strong constraints on galaxy evolution models in low and high redshifts, informing which models of infall and outflow of gas are acceptable. We explore the mass–metallicity–SFR relation in light of the SDSS–STARLIGHT database put together by our group. We find that we recover similar results as the ones reported by authors who use the MPA/JHU catalogue. We also present some preliminary results exploring the mass–metallicity–SFR relation in a more detailed fashion: starlight recovers a galaxy’s full star formation history, and not only its recent SFR.

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MAGAL: A NEW TOOL TO ANALYSE GALAXIES PHOTOMETRIC DATA

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On galaxy spectra, one can find mainly two features: emission lines, which tell us about the ionised gas content, and the continuum plus absorption lines, which tell us about the stellar content. They thus allow us to derive gas-phase abundances, the main radiation sources, chemical enrichment and star formation histories. Broad-band photometry, on the other hand, is much more limited and hinders our ability to recover a galaxy’s physical properties to such a degree of detail. However, with the recent development of redshift surveys using the technology of ultra-narrow filters ($\approx 100 \text{ \AA}$), such as ALHAMBRA, J-PAS and DES, it will be invaluable to be able to retrieve information on physical properties of galaxies from photometric data.

Motivated by this data avalanche (which goes up to the petabyte scale), we decided to build our own SED-fitting code: Magnitudes Analyser (MAGAL), which has three modules. 1) A template library generation module: generates empirical and theoretical template libraries. 2) Bayesian fitting module: calculates probability distribution functions (PDFs) for given observed and library template data. This is