How reliable are galaxies physical parameters estimations for LSST main sequence sample?

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Abstract

The upcoming Large Survey of Space and Time (LSST), conducted by VeraRubin Observatory, will produce, over a 10-year period, multi-petabyte archive of images and catalogs of astrophysical sources on more than 18000 square degrees of the southern sky. Reaching magnitude depth of$\sim$26.5 (AB) in the six bands ugrizy, LSST data will be useful to perform a wide variety of high precision statistical studies, allowing to obtain more accurate measurements of astrophysical quantities. I will present studies based on simulated LSST observations of real galaxies in the ELAIS-N1 and COSMOS fields of the Herschel Extragalactic Legacy Project (HELP) survey. Spectral Energy Distributions (SEDs) were fitted to the real and simulated photometric measurements of 65,889 galaxies in the redshift range $0< z < 2.5$, using the latest release of a galaxy SED fitting code CIGALE. We compare main galaxy physical parameters, such as star formation rate (SFR), stellar mass and dust luminosity obtained from real data using ultraviolet and infrared observations to the same parameters obtained from the simulated optical LSST measurements only. We conclude there is a possible overestimation of SFR, dust luminosity and dust mass if they are calculated with LSST photometric measurements only. This overestimation is found to depend on redshift, diminishing up to z= 2.5. The least sensitive parameter is the stellar mass which was found to be reliably estimated even if based only on the optical bands

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