

LSST's AuxTel: a little telescope for a large galaxy survey

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Abstract

The Large Survey of Space and Time (LSST) will start to carry out a massive survey which will provide data with statistical errors below the systematic uncertainty due to photometric calibration. With the massive number of objects that it will observe, the statistical errors will shrink, making systematic effects the main source of uncertainty. In this regard, measuring colours and calibrating them will be a crucial task for LSST and similar photometric cosmological surveys in their way to obtain reliable cosmological measurements. This is particularly important for obtaining cosmological information from supernovae and to compute photometric redshifts. One of the main sources of photometric uncertainty is associated with the variations on instrumental and atmospheric transmission. To deal with atmospheric effects, LSST counts with a companion telescope, the Auxiliary Telescope (AuxTel), whose purpose is to measure the atmospheric transparency and to derive colour corrections based on spectroscopic observations. In this contribution we will go through the latest improvements that we carried out on AuxTel during September 2023, the methodologies that we are developing to correct for systematic effects on its focal surface and to properly extract spectra and the progress made on our method to derive colour compensations from spectra taken with AuxTel to be applied to LSST's photometry. This way, we aim to ensure uniformity across the sky and repeatability of the measurements across the 10 years of survey.

My poster in zenodo.org can be found here