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High-redshift LBG selection from broadband and wide photometric surveys using a Random Forest algorithm

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Lyman-Break Galaxies (LBGs) are promising tracers for exploring the properties of dark energy in the high-redshift Universe. In light of DESI-II, the extension of the current Dark Energy Spectroscopic Instrument (DESI) that will start in 2029, the role of broadband-wide photometric surveys such as UNIONS or the Vera C. Rubin LSST is essential to design the optimal selection of these $z \geq 2$ tracers. In this work, we explore the feasibility of selecting LBGs using a Random Forest approach in the redshift range $2.5 < z < 3.5$, using existing deep imaging data from HSC and CLAUDS (u , g , r , i , and z bands) degraded to the UNIONS depth. For a target density budget of $1,100 \text{ deg}^{-2}$, we expect from this work a density of spectroscopically confirmed LBGs of 490 deg^{-2} . Our UNIONS-like target selection was tested during a dedicated DESI observation campaign on the COSMOS field, providing a safe spectroscopic sample of 460 targets with a mean redshift of 3. This sample is then used to derive forecasts for DESI-II. This talk is based on the paper arXiv:2410.08062, recently submitted to JCAP.

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