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A Redshift-Limited Sample Selection and Photometric Redshift Estimation for 4MOST WAVES: Prospects for LSST

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In this talk, I will present a machine learning-based approach to select a redshift-limited sample using multi-band photometry when spectroscopic redshifts are not available. The technique is a decision tree-based binary classification, which has been further extended into a photometric redshift estimation method. This selection methodology has been applied to select targets for the WAVES survey of the Multi-Object Spectroscopy Facility (4MOST). WAVES has a key science goal of probing the halo mass function to fainter magnitudes compared to previous surveys like GAMA. The ML selection method achieves completeness of over 90%, as desired by the survey. We demonstrate that our method achieves photo-z scatter σ_NMAD ~ 0.015 when tested against the DESI DR1 sample flux-limited to 21.2 in Z-band magnitude.

This sample selection and photometric redshift estimation methodology can be successfully applied to a large photometric survey like LSST, and we see it as a potential contribution to the LSST DESC photo-z community.

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