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ABSTRACT ONLY

MASSIVE PHOTOMETRIC CATALOGS FOR S-PLUS: OBJECT CLASSIFICATION AND QUASAR PHOTOMETRIC REDSHIFTS

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The Southern Photometric Local Universe Survey (S-PLUS; Mendes de Oliveira et al. 2019) will cover 9300deg2 of the Southern Sky with an 80-cm telescope (T80S) located at Cerro Tololo Inter-American Observatory in Chile. The S-PLUS optical filter system includes five broad bands: u, g, r, i, z (similar to the SDSS filter system, except for the u band) and seven narrow-band filters: J0378, J0395, J0410, J0430, J0515, J0660 and J0861, centred on [OII], Ca H+K, Hγ, G-band, Mgb triplet, Hα and Ca triplet features, respectively. The latest public data release (DR4) covers 3000 squared degrees.

In this work we detailed the construction of two value-added catalogues for S-PLUS DR4: the star/quasar/galaxy classification and quasar photometric redshifts. The former was obtained by a Random Forest algorithm that classifies any S-PLUS observation in quasar, star or galaxy. A complete description of all tested feature spaces, metrics, cross-validation, and performances on S-PLUS DR2 can be found in Nakazono et al. (2021). For the quasar photometric redshifts we use data from S-PLUS DR4 in three machine learning methods: Random Forest, FlexCoDE, and Bayesian Mixture Density Network. FlexCoDE had the best performance with a precision of 0.042 and conditional density estimation loss of -2.84. Using the information from these two value-added catalogues, we then provide a catalogue of quasar candidates (Nakazono & Valença, submitted) containing 626 418, 220 177, and 131 376 quasar candidates with probabilities higher than 80%, 90%, and 95%, respectively.

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