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SciPIC - Populating a dark matter Universe

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In this work, we introduce a calibration pipeline for SciPIC specifically designed to constraining HOD parameters for accurately describing the observed clustering at low redshift. The pipeline consists of a simplified SciPIC version that generates a galaxy mock catalogue by assigning central and satellite galaxies within dark-matter halos with their corresponding positions, luminosities and colours. Then, it computes the 2-point correlation function in luminosity bins from the generated mock. The HOD parameters are optimized using MCMC sampling by comparing the obtained clustering with SDSS measurements at low redshift. To assess the performance of our implementation, we apply the pipeline to the halos identified on the Euclid Flagship N-body dark matter simulation, obtaining a good agreement between the fit HOD parameters and those adopted to generate FS2 galaxy mock catalogue. This pipeline will enable the proper calibration of future modifications and updates to be introduced into SciPIC. Additionally, it facilitates the production of mocks for various types of dark matter simulations used as input, which will be crucial for generating predictions for diverse cosmological scenarios.

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