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Cosmology from the Rubin Void Size Function

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Cosmic voids are a powerful tool to extract cosmological constraints and study galaxy properties' dependence on the environment. This project builds a pipeline for constraining cosmological parameters using the void size function (VSF). We build the void catalogs from the SkySim5000 galaxy catalogs using the publicly available VIDE void finder. The cosmological constraints' inference relies on the state of the art theoretical model for the VSF and this project is the first to confront theoretical models to measurements made from voids obtained from photometric redshift tracer data, without assuming a spherical shape for voids. As such, it investigates the impact of statistical and systematic photometric redshift uncertainties on void statistics. Extracted constraints include constraining the dark energy equation of state, σ_8 , the dark matter density, the content of the Universe and the sum of neutrino masses.

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