What is a Void? The Systematic Impact of Galaxy Void-Finding Algorithms on Studies of Large-Scale Structure[1] DYLAN VEYRAT, KELLY DOUGLASS, SEGEV BENZVI, FATIMA ZAIDOUNI, University of Rochester, DARK ENERGY SPECTROSCOPIC INSTRUMENT COLLABORATION — Voids are expansive regions in the universe containing significantly fewer galaxies than surrounding galaxy clusters and filaments. Voids are a fundamental feature of the cosmic web, and provide important information about galaxy physics and cosmology. For example, correlations between voids and luminous tracers of large-scale structure improve constraints on the expansion of the universe compared to using tracers alone. However, the definition of a void can be vague and may differ significantly between void-finding algorithms. In this work we systematically compare several void finders and describe the relative strengths and weaknesses of each algorithm for cosmology and environmental studies. We quantify the impact of the definition of a void on cosmological parameters using data from the Sloan Digital Sky Survey (data releases 7 and 12) and simulated surveys from the upcoming Dark Energy Spectroscopic Instrument.

[1]DOE

Dylan Veyrat
University of Rochester