

Abstract

This Ph.D. thesis is a collection of clustering studies in different galaxy samples selected from the Sloan Digital Sky Survey and the SDSS-III/Baryon Oscillation Spectroscopic Survey. By measuring the two-point correlation function of galaxy populations that differ in redshift, color, luminosity, star-formation history and bias, and using high-resolution large-volume cosmological simulations, I have studied the clustering properties of these galaxies within the large scale structure of the Universe, and those of their host dark matter halos. The aim of this research is to stress the importance of star-forming galaxies as tools to perform cosmology with the new generation of wide-field spectroscopic surveys. Among the galaxies considered, I have focused my investigation on a particular class whose rest-frame optical spectra exhibit strong nebular emission lines. Such galaxies, better known as Emission-Line Galaxies (ELGs), will be the main targets of near-future missions – both ground-based, as the Dark Energy Spectroscopic Instrument, the 4-metre Multi-Object Spectroscopic Telescope, the Subaru Prime Focus Spectrograph, and space-based as EUCLID. All these surveys will use emission-line galaxies up to redshift $z \sim 2$ to trace star formation and to measure the Baryon Acoustic Oscillations as standard ruler, in the attempt to unveil the nature of dark energy. Therefore, understanding how to measure and model the ELG clustering properties, and how they populate their host dark matter halos, are fundamental issues that I have addressed in this thesis by using state-of-the-art data, currently available, to prepare the clustering prospects and theoretical basis for future experiments.