

Abstract Submitted
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Calculation of Large-Scale Structure Power Spectra in a Spherical Fourier Bessel Basis¹ BRANDON KHEK, Rice University, HENRY GEBHARDT, OLIVIER DORE, Jet Propulsion Laboratory, California Institute of Technology — Upcoming deep (high redshift) wide-angle (large survey area) galaxy redshift surveys such as the High-Latitude Spectroscopic Survey of the Nancy Grace Roman Space Telescope and SPHEREx are estimated to measure the redshifts of millions of galaxies. A spherical Fourier Bessel (SFB) basis for the power spectrum will fully maximize the extraction of cosmological information from this data, and using this basis, we exploit the statistical efficiency of calculations in the Fourier space by naturally separating the angular and radial components over a sphere. In this project, we provide code written in Julia to calculate the SFB power spectrum which is customizable for the parameters set by the survey data and assumed cosmology. By providing robust calculations of the SFB power spectrum, our code plays a crucial role in the analysis of wide-angle galaxy surveys and ensures unbiased results on large scales. The code will eventually be leveraged to study how physical effects, such as baryon acoustic oscillations, redshift-space distortions, primordial non-Gaussianity, and modified theories of gravity, manifest themselves in the SFB power spectrum.

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Brandon Khek
Rice University

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