

Detecting Relativistic Doppler by Multi-tracing a Single Galaxy Population

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The detection of relativistic Doppler via galaxy power spectrum measurements could further confirm the validity of general relativity at scales very far from the strong-gravity-field regime, where it has been tested with exquisite accuracy. The Doppler term acts as an imaginary correction in the relation between the galaxy density contrast and that of matter, which mostly affects the large scales usually plagued by cosmic variance. Moreover, it is sample-dependent, so different galaxy populations display different contributions in their power spectra. In the search for the optimal galaxy samples to achieve a detection of the relativistic term, we can split a galaxy population according to luminosity, and then perform a multi-tracer analysis with auto-correlations of the sub-samples and their cross-power spectrum. I will be talking about such a technique which extracts multi-tracer benefits out of a single dataset and may lead us to a detection of the relativistic effect with data from ongoing galaxy surveys, such as Euclid and DESI.

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