

Higher-order statistics as probes for parity symmetry

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Parity symmetry, which posits the conservation of physical laws under spatial inversion, was initially presumed to extend from macroscopic phenomena down to subatomic scales. However, its applicability at cosmological scales remains largely unexplored. In this talk, I will briefly review using the galaxy four-point functions to search for parity violation at cosmological scales. In addition, I will also present a new estimator that is tailored to be sensitive to parity transformation. This new “compressed” estimator, the parity-odd power spectrum (POPS), is not only accelerates computation but also significantly reduces the number of degrees of freedom. This reduction directly addresses the computational challenges associated with the four-point function, especially concerning covariance matrix estimation. I will show preliminary results for the POPs and discuss how it complements the four-point function in the context of the next generation spectroscopic survey.

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