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Abstract for an Invited Paper
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Exploring New Physics with N-Point Correlation Functions

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I present the galaxy 4-Point Correlation Function (4PCF) can test for cosmological parity violation. The detection of cosmological parity violation would reflect previously unknown forces present at the earliest moments of the Universe. I outline recent developments both in rapidly evaluating galaxy N-Point Correlation Functions (NPCFs) using GPUs and in determining the corresponding covariance matrices. These make the search for parity violation and other physics in the 4PCF and beyond possible in current and upcoming surveys such as those undertaken by Dark Energy Spectroscopic Instrument (DESI), the Euclid satellite, and the Vera C. Rubin Observatory (VRO).