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Anisotropic Correlations in Fourier Phases

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Correlations in Fourier phases of the cosmological density field arise as a consequence of non-linear structure formation. Since two-point statistics are blind to phase factors, measures of pure phase information will not only be independent of the conventional power spectrum or two-point function, they also do not suffer from Gaussian variance on the modulus of the density field and linear bias. They may thus be regarded as an additional and potentially valuable probe of large-scale structure in upcoming galaxy surveys. Starting from a recently proposed measure of phase information, the line correlation function, I will present an anisotropic generalisation that is capable of detecting anisotropies in the distribution of galaxies. Based on a number of numerical studies, I will then discuss how the Alcock-Paczynski effect and kinematical redshift-space distortions can in principle be measured from Fourier phases.

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