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The Self-Calibration of the Galaxy Intrinsic Alignment Contamination to the Cosmic Shear Signal MICHAEL TROXEL, University of Texas at Dallas — Weak gravitational lensing due to large scale structure (cosmic shear) has been identified as a critical tool in studying the evolution of large scale structure in the universe, as well as shedding light on the nature and influence of dark matter and dark energy. One of the primary systematic biases in weak lensing, the intrinsic alignment (IA) of galaxies, poses a barrier to precision weak lensing measurements, and methods for identifying and removing its effects on cosmological information are key to the success of current and planned lensing surveys. We have addressed this problem by expanding model-independent techniques to indirectly measure and remove the IA contamination from the lensing signal. These self-calibration techniques take advantage of complimentary survey information to self-calibrate the lensing signal, which along with the unique lensing and IA geometry and separation dependencies, allow us to reconstruct the various IA correlations at the level of the spectrum and bispectrum. For cross-correlations, we have demonstrated that the self-calibration approach can reduce the IA bias over most relevant scale and redshift ranges by up to a factor of 10 or more. In the case of auto-correlations, we have demonstrated the feasibility of implementing the self-calibration for conservative estimates of photo-z accuracy in planned surveys. In both cases, the self-calibration has the added benefit of preserving the IA signal, which itself provides additional information which can be used in studying the formation and evolution of large scale structure in the universe.

Michael Troxel
University of Texas at Dallas

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