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Magnification bias for cross-correlation of CMB lensing and galaxy clustering in LSST

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Cosmology is currently in a period of rapid development. During the past decade, increasing observational evidence has led to the establishment of the LCDM model. Despite its success, the latter has recently been challenged by several tensions. The combination of galaxy surveys and CMB lensing is a powerful probe of the large-scale structure and a key tool for testing the standard cosmological model in the era of next-generation experiments. Upcoming galaxy surveys such as the Legacy Survey of Space and Time (LSST), together with CMB experiments such as the Simons Observatory (SO) and LiteBIRD, will dramatically improve the volume of the available data. On the on the other hand, such surveys will also require careful control of increasingly important observational systematics. One important effect is magnification bias, arising from lensing-induced fluctuations in observed galaxy number counts. While previous studies focused on low redshift galaxy clustering and clustering-shear cross-correlations, I will show that magnification bias grows dramatically for the higher redhsifts probed by LSST. In particular, I will present studies of the effect on the CMB lensing-galaxy clustering cross-correlation following a novel tomographic approach. Understanding and mitigating magnification bias will be crucial to fully exploit LSST data, and to shed light on the unresolved cosmological tensions.

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