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Weak lensing cosmology beyond two-point shear correlations

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With the fast development of high-precision large photometric surveys, weak lensing (WL) effects have become one of the major probes in cosmology. While the two-point shear correlations are the most extensively employed analyses, other statistics beyond that are desired because of the non-Gaussian nature of cosmic structures. In this presentation, I will discuss the cosmological application of WL peak statistics, particularly the high peak statistics, which are closely related to nonlinear massive halos. Besides the commonly adopted peak height statistics, a new analysis based on the peak steepness will also be presented, and the relevant systematics will be discussed. In addition, I will also discuss the potential of combining WL shear and magnification effects to calibrate the shear multiplicative bias using data alone.

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