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Constraining reionization with the CMB optical depth fluctuation - Compton-y cross-correlation

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In the era of the high-precision CMB measurements, in addition to the conventional power spectrum, other observables will help to constrain cosmology. For example, the gravitational lensing effect introduces correlations between different modes of CMB fluctuations. This mode-mode correlation has been used to reconstruct gravitational lensing from CMB data. Other secondary effects could also produce a similar mode-couplings in CMB. In this talk, I will introduce my recent works on constraining reionization through the optical depth fluctuations which cause another type of mode-mode correlation in CMB anisotropies. I will present the first measurement of the cross-correlation between optical-depth fluctuations — Compton-y map for constraining reionization with Planck data.

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