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Relativistic SZ maps and electron temperature spectroscopy

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While third-generation CMB experiments have allowed to release the first maps of the Compton- y distortion due to thermal Sunyaev-Zeldovich (SZ) effect, next-generation CMB experiments should allow to map also the electron gas temperature, T_e , across the sky through the detection of relativistic corrections to the thermal SZ effect. We will discuss about the experimental requirements to break the y - T_e degeneracy of the observed SZ intensity, and propose a new component separation approach based on moment expansion to disentangle the y and T_e observables of the relativistic SZ effect while mitigating foregrounds. We will show that this approach offers a new spectroscopic view of the galaxy clusters not only across frequencies but now also across temperatures. We will also show how the relativistic electron temperature power spectrum provides a new cosmological observable which could complement the Compton- y map power spectrum to break some of the parameter degeneracies in future cosmological SZ analyses.

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