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**The Effect of Electron-Ion Equilibration on the Sunyaev-Zel'dovich Effect of Galaxy Clusters** FANG PENG, DAISUKE NAGAI, SUMAN BHATTACHARYA, VASILIKI PAVLIDOU, California Institute of Technology — Sunyaev-Zel'dovich effect (SZE) is a new observational probe that promises to provide new insights into cosmology and plasma astrophysics of galaxy clusters. The SZE is a distortion in the cosmic microwave background spectrum caused by hot electrons produced by shock-heating of intergalactic medium in the cluster outskirts. During this process, most of the kinetic energy goes into ions and little to electrons, causing the electron temperature to be considerably smaller than the ion temperature. Electrons and ions eventually equilibrate through Coulomb interactions, but this equilibration process is longer than the Hubble time in the outskirts of clusters. In this work, we investigate the electron-ion equilibration process in galaxy clusters and show how this process affects the SZE signals. We will also discuss implications for cluster gas evolution and cosmological constraints derived from upcoming SZE cluster surveys.

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