

Contributed Talk

Splinter CCAT

TOMOGRAPHY OF COSMIC REIONIZATION THROUGH [CII]
INTENSITY MAPPING AT REDSHIFTS 5–9 WITH CCAT-P

D. A. Riechers¹, on behalf of the CCAT-p consortium

¹*Cornell University, Ithaca, NY, USA*

The epoch of cosmic reionization (EoR) describes the time period during which the transition from the cosmic dark ages when the universe is largely neutral to a universe in which intergalactic hydrogen is largely ionized takes place. This transition is thought to be dominantly driven by ionizing photons that emerge from the first star-forming galaxies early in cosmic history, within the first billion years after the Big Bang – corresponding to redshifts beyond 5.7. Due to the faintness of most of these young galaxies, and the absorption of their ultraviolet emission by the increasingly neutral intergalactic medium at these early epochs, systematic studies of the EoR based on individual sources of reionization remain challenging even in the era of the James Webb Space Telescope. We here describe a new promising method to probe the EoR using the upcoming CCAT-p telescope. Instead of targeting individual galaxies, this method maps the clustering signal from the faint, but highly numerous reionization sources in aggregate through the intensity mapping technique. CCAT-p will target the [CII] line at rest-frame 158 micron, typically the brightest cooling line of the interstellar medium in star-forming galaxies, which in contrast to more traditional tracers is not absorbed by neutral hydrogen in the intergalactic medium. Through this experiment, CCAT-p will shed light on the end of the cosmic dark ages, probing one of the last largely unexplored eras in the history of the universe.