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Contributions of extragalactic emission lines to ground-based CMB observations

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Similarly to the CIB, emission lines can be an appreciable source of extragalactic foreground anisotropies for CMB experiments. If bright enough, they may be a relevant component to account for in component separation, given their strong correlation with the CIB, and even extracted as signal from the CMB observations. Therefore, they may entail both a challenge and an opportunity for modelers and observers.

We focus on the CO rotational lines at redshifts $z \sim 0 - 6$, using an empirical parametrizations for the CO luminosities based on sub-mm observations. We find that at $\ell = 3000$ the amplitude of both CO autocorrelation and cross-correlation with the CIB could be detectable in an ACT-like experiment, especially when cross correlating different frequency bands. This implies that current observations can potentially be used to constrain the bright end of CO luminosity functions, which are difficult to probe with current sub-mm telescopes due to the small volumes they survey. We will discuss the significant implications in template-based searches for CMB secondaries, such as the kSZ, and potential strategies to isolate and measure the contribution from emission lines.

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