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# The CO Mapping Array Pathfinder (COMAP): Status and future prospects

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## Abstract

The CO Mapping Array Pathfinder (COMAP) will open a new window on both the Epoch of Reionization (EoR) and the Epoch of Galaxy Assembly by using carbon monoxide (CO) lines to trace the distribution of star-forming galaxies in both epochs. Phase I of COMAP will focus on constraining the CO(1-0) power spectrum from the Epoch of Galaxy Assembly and science operations are expected to begin in Spring 2019.

The Phase I instrument comprises a 10-m telescope, located at the Owens Valley Radio Observatory (OVRO), equipped with a 19-pixel spectrometer array that will map a total of 5 square degrees of sky in the frequency range 26-34 GHz with 2-MHz spectral resolution. This band will be sensitive to CO(1-0) in the redshift slice  $z=2.4-3.4$  and to CO(2-1) in the redshift slice  $z=6-8$ .

With two years of data we will detect the CO(1-0) fluctuations at 8 sigma, according to

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our fiducial model. By cross-correlating with galaxy surveys, we expect to be able to validate the origin of the signal in galaxies at the appropriate redshift as well as making a detection in cross-correlation. We will place constraints on the CO luminosity function and trace the cosmic molecular gas abundance and star formation history. Predictions from observations/simulations of periodic disruption in star formation will be tested. Future phases of COMAP will improve our detection of the  $z=2.4-3.4$  signal and add a second frequency channel targeting the  $z=6-8$  signal from the EoR.