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Progress towards measuring the HI auto power spectrum with CHIME

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The Canadian Hydrogen Intensity Mapping Experiment (CHIME) is a drift-scan radio interferometer located at the Dominion Radio Astrophysical Observatory (DRAO) in Penticton, British Columbia, Canada. CHIME, operating between 400 and 800 MHz, will map the redshifted 21-cm emission of neutral hydrogen between redshifts z = 0.8 – 2.5 across the northern sky. The 21cm line is a tracer of the large-scale structure of matter, whose statistics encode a well-understood standard ruler, the baryon acoustic oscillation scale. By detecting and tracking the evolution of this scale with redshift, CHIME aims to constrain the expansion history of the Universe over this crucial redshift epoch when the overall energy density of the Universe is expected to have become dominated by dark energy. However, measuring the cosmological 21-cm signal is challenging due to bright astrophysical foregrounds, which are about 4-5 orders of magnitude brighter than the cosmological HI signal, coupled with chromatic instrument response and also emission from terrestrial sources. I will discuss methodologies developed to address these issues and the improvements made in the data processing to measure the cosmological 21-cm signal in auto-correlation. I will show the first results of the auto power spectrum using CHIME data.

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Classification de Session: Contributed Talks 1: CHIME & CHORD