A SYNOPTIC VIEW OF THE MAGELLANIC CLOUDS:
VMC, GAIA AND BEYOND

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Cold Neutral Gas and Molecular Gas at Low Metallicity in the Small Magellanic Cloud

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The Small Magellanic Cloud (SMC) provides the only laboratory to study the detailed physics of star formation and the interstellar medium relevant to the high redshift universe. Not only is the transition from warm to cold neutral gas a rate limiting step to the formation of molecular gas, but it appears to influence star formation efficiency globally. We present first results from a new HI and using the ATCA cold atomic gas temperature and fraction at low metallicity. The survey includes 55 sources in the SMC, which doubles the number of existing observations with up to 5x greater sensitivity and 4x higher spectral resolution than previous absorption line studies. These measurements of the optical depth allow us to constrain the amount of "CO-faint" gas that is optically thick HI. We find very cold (20 K) temperatures for individual cold gas clouds and an average cold HI cloud temperature of 30 K, lower than in the Milk Way, and a cold atomic gas fraction of 25% for the SMC, which is similar to the Milky Way and the Local Group. ALMA ACA CO observations revealed that many regions with cold atomic gas have little CO emission and possibly no molecular gas. I will also present preliminary results.