Physical and Chemical Conditions in Centaurus A\textsuperscript{1} MARK MC-COY, New Mexico Tech, JUERGEN OTT, National Radio Astronomy Observatory, DAVID MEIER, New Mexico Tech — We present high-resolution maps of rotational transitions of the molecules $^{12}\text{C}^{16}\text{O}$, $^{13}\text{C}^{16}\text{O}$, $^{12}\text{C}^{18}\text{O}$, HCN, and HCO$^+$ toward the nuclear region of the nearby active galaxy, Centaurus A (Cen A). At $\sim$3.8 Mpc away, Cen A is the closest radio galaxy, so it serves as the best laboratory for determining how accretion onto a supermassive black hole affects the structure and evolution of a galaxy. The data were obtained with the Atacama Large Millimeter Array interferometer during Early Science commissioning. The CO isotopologue data reveals the morphology of Cen A. Two arm-like features were found along with a $\sim$200 pc disk-like feature associated with the supermassive black hole. The CO isotopologues preferentially trace the arms, while HCN and HCO$^+$, tracers of high density gas, dominate the disk feature. Large velocity gradient radiative transfer models of the CO line ratios constrain the gas in the arms to be warm ($T>50$ K) and modestly dense ($n_{H_2} \sim 10^3$ cm$^{-3}$). The enhanced emission from HCN and HCO$^+$, suggest the disk-like feature is much denser, or influenced by anomalous chemical processes from the black hole radiation field.

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