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Physical and Chemical Conditions in Centaurus A[1] MARK MCCOY, 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 $^{12}C^{16}O$, $^{13}C^{16}O$, $^{12}C^{18}O$, HCN, and HCO^+ toward the nuclear region of the nearby active galaxy, Centaurus A (Cen A). At ∼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 ∼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_{H2} $\sim 10^3$ 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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