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Molecular Gas in the Andromeda Galaxy BENJAMIN GERARD, JEREMY DARLING, NIKTA AMIRI, Center for Astrophysics and Space Astronomy, University of Colorado at Boulder — We present results from an Andromeda Galaxy (M31) survey of star-forming regions based on 24 μm luminosity for H_2O masers, NH_3 (1,1) and NH_3 (2,2) lines, and Hydrogen recombination lines (H66α). Although five H_2O masers were detected in the initial survey of 206 regions towards M31, we do not detect additional masers in a follow up survey of 300 similar compact 24 μm regions. We do not detect NH_3 (1,1), NH_3 (2,2), or H66α lines in any of the 506 regions. The typical rms noise for 3.3 km s^{-1} channels in individual spectra is 2.5 mJy. Additionally, averaging all 506 spectra, shifted to the correct radial velocity, yields no detection for H_2O, NH_3 (1,1), NH_3 (2,2), or H66α. The typical rms noise for 3.3 km s^{-1} channels in stacked spectra is 0.13 mJy. The non-detection of NH_3 provides an upper limit on NH_3 column density and corresponding dense gas fraction. In calculating this upper limit, we use both Herschel infrared continuum data and CO integrated line data to independently determine the mean molecular gas mass of each region and corresponding upper limits on the dense gas fraction.

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