

THE TRANSITION FROM DIFFUSE ATOMIC CLOUDS TO DENSE MOLECULAR CLOUDS

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We explore the transition from diffuse to dense molecular gas by combining a variety of tracers for density and composition. Observations and chemical modeling of CH, CH⁺, and CN absorption at visible wavelengths from McDonald Observatory and the European Southern Observatory are combined with ultraviolet observations of CO and H₂ absorption from the Far Ultraviolet Spectroscopic Explorer and the Hubble Space Telescope, as well as emission data from the GOT C+ survey with the Herschel Space Telescope. The selected tracers from visible, ultraviolet, and radio wavelengths allow the characterization of neutral diffuse gas, including CO-dark gas. Sight lines, such as those toward η and χ Persei or those toward Chamaeleon provide a opportunity to examine the transition from atomic to molecular gas and help to describe the nature of the gas.