LARGE INTERSTELLAR AND COMETARY MOLECULES OF BIOLOGICAL INTEREST

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In both the interstellar medium and comets, the astrochemistry of large, highly saturated molecules of biological interest can be studied by utilizing three properties of radio interferometric arrays: high angular resolution over a large field of view; very high pointing precision for the high angular resolution synthesized beam; and spatial filtering. Autocorrelation spectra from single-element telescopes are useful for observing extended low temperature clouds of molecular gas that form via gas phase ion-molecule reactions. In contrast, array spatial filtering suppresses the extended emission from ion-molecule chemistry, thereby lessening confusion. Thus interferometric arrays have become important instruments for studying chemically active compact objects in high-mass regions of star formation called hot molecular cores (HMCs). The relevance of HMCs to prebiotic organic chemistry has been strengthened as evidence has emerged for a hot core phase in low-mass star formation regions. Images of low-mass young stellar objects have revealed both physical conditions that mimic those in HMCs, and also large abundances of grain mantle products such as methanol. Consequently, interferometric studies of large, saturated interstellar molecules in the ISM have been extended to comets. Emission sources associated with the cometary nucleus can be separated from those associated with the extended coma. A key goal is the interferometric detection and mapping of cometary glycine, which should be formed along chemical pathways similar to those for HMC species.