
The influence of cosmic rays on the local ISM as revealed by interstellar chemistry

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Abstract

The network of fast ion-molecule reactions that drives gas-phase chemistry in the interstellar medium is initiated by cosmic-ray ionization of both atomic and molecular hydrogen. Abundances of several species, including H₃⁺, OH⁺, and H₂O⁺, among others, are closely linked to the cosmic-ray ionization rate, and so can be used to infer this parameter in clouds where they are observed. These molecules have been detected throughout the Galaxy, allowing us to construct a picture of how the cosmic-ray ionization rate and the underlying particle spectrum vary with location. I will discuss the current status of our observational surveys of molecular ions within the Galaxy.

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