

Chemical Tracers of Interstellar Turbulence

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Turbulence is ubiquitous in the interstellar medium and has been suggested as a means of accounting for the lower than expected O₂ abundance observed by the Submillimeter Wave Astronomical Satellite.

Here we present the results of a model of turbulent diffusion in molecular cloud cores and its effects on the chemistry. We extend previous models by including gas/grain interactions and H₂ photodissociation. We find that HI is a very sensitive tracer of the magnitude of the diffusion coefficient and suggest that a test of the validity of the models could be made using high resolution absorption measurements of the HI abundance towards molecular clouds. We compare the abundances of other molecules with the observations and find that we can account for the low O₂ and H₂O observed abundances. Other molecules are also found to be in accord with the available data.