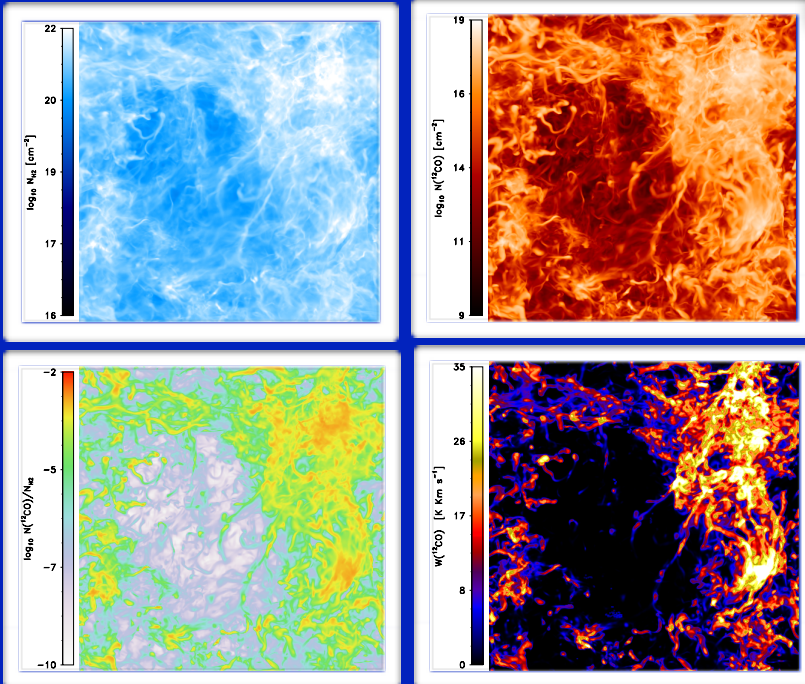


Can we trust CO emission

as a probe of the densities and temperatures in molecular clouds



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Setup:

ZEUS-MP + chemistry -> RADMC-3D

- $n=100 \text{ cm}^{-3}$, $Z=Z_{\odot}$
- size of 20 pc
- RMS velocities of 5 km/s
- turbulent crossing times $\approx 2 \text{ Myrs}$

- **CO is a biased tracer of the gas. It primarily traces material at high densities**
- **The total H_2 mass derived from W_{CO} maps, considering a fixed X_{MW} -factor, is underestimated by about 40%**
- **T_{EX} represents a lower limit of T_{K}**
- **CO observations alone give a misleading view of the physical conditions in the clouds. Complementary observations of the lower density gas (e.g. with C^+ , C) are required**