

# The $\gamma$ -ray view on the HI-H<sub>2</sub>-CO interface in nearby clouds

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The interstellar gamma-ray emission can be used to infer the column densities of optically-thick HI, diffuse CO-dark H<sub>2</sub>, and dense CO-bright H<sub>2</sub> in a cloud. We have used observations by the Fermi Large Area Telescope and by Planck, together with HI and CO line data to probe the HI-H<sub>2</sub>-CO transitions in a sample of nearby clouds in the Chamaeleon and anticentre regions. We will show how the gas mass in the dark neutral medium (DNM) present at the atomic-molecular interface relates to the mass observed in the other bright phases [1]. The DNM fraction by mass varies with the diffuse character and peak CO intensity of the cloud [1].

We will also discuss how the average CO-to-H<sub>2</sub> conversion factor per cloud,  $X_{\text{CO}}$ , tends to decrease from diffuse to more compact CO clouds, in qualitative, but not quantitative agreement with theoretical predictions [2].

## Références

[1] Remy, Q., Grenier, I. A., Marshall, D. J., & Casandjian, J.M., accepted by A&A (2018), arXiv:1711.05506

[2] Remy, Q., Grenier, I. A., Marshall, D. J., & Casandjian, J.M., A&A, 601, A78 (2017)