Molecular Gas, Dust, and Star Formation in Galaxies
Proceedings IAU Symposium No. 292, 2012
T. Wong & J. Ott, eds.

doi:10.1017/S1743921313000367

Atomic and Molecular Gas in M17 SW

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Abstract. We probe the spatial distribution of the [C II] 158 μm fine-structure emission and its association with neutral and molecular gas in a $5'.7 \times 3'.7$ ($\sim 3.3 \times 2.1$ pc^2) region of the M17 SW nebula. Comparison of velocity-resolved [C II] emission maps with other atomic and molecular tracers is possible for the first time with the dual band receiver GREAT on board the SOFIA airborne telescope. We detected [C II] emission in a much broader velocity range than the CO-lines (Pérez-Beaupuits *et al.* 2012). Only [C II] narrow channel maps at intermediate velocities (between 10 and 24 km s^{-1}) show correlations with other molecular gas components, supporting a clumpy cloud scenario. At lower (<10 km s^{-1}) and higher (>24 km s^{-1}) velocities instead, we see more than 60% of the region mapped in [C II] that is not associated with other tracers of star-forming material, the so called "CO-dark" gas. Interaction with winds and outflows lead to substantial excitation of [C II] emitting gas, so that ablation and shock-interaction have to be taken into account to model the observed [C II] emission.

Keywords. ISM: structure — ISM: atoms — ISM: clouds — ISM: individual (M17)

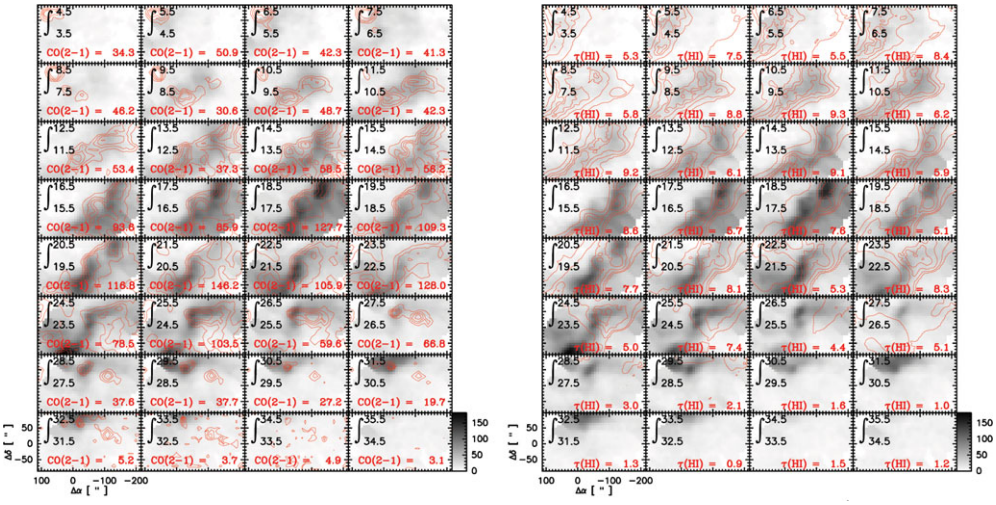

Figure 1. Channel maps of the [C II] 158 μm emission (gray scale - K km s^{-1}) integrated in 1 km s^{-1} channel wide in the velocity range 3.5 km s^{-1} to 35.5 km s^{-1}. The contours show the corresponding channel maps of ^{12}CO J=2–1 (*left panel*), and τ(HI) (*right panel*) in 20% steps of the peak integrated values (bottom right in the maps). All maps but τ(H I) were smoothed to a resolution of $\sim 21''$. This is an extended version of Fig.3 by Pérez-Beaupuits *et al.* (2012).

Reference

Pérez-Beaupuits, J. P., Wiesemeyer, H., Ossenkopf, V., Stutzki, J., *et al.* 2012, *A&A*, 542, L13