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The H I Distribution in Two Blue Compact Dwarf Galaxies

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Abstract. We present VLA H I imaging of two actively star forming dwarf galaxies, Haro 2 and Haro 4, and include a map of the CO distribution of Haro 2 obtained with OVRO. We discuss some preliminary results based on the distribution of the neutral and molecular gas and its relation to star formation activity.

1. Results

With the aim of studying the relation between star formation episodes in dwarf galaxies and the interstellar medium, we mapped the neutral gas distribution of Haro 2 (Mrk 33) and Haro 4 (Mrk 36). The data were obtained with the NRAO–VLA[1]. In addition, we made a CO(1–0) map of Haro 2 using the millimeter interferometer of the Owens Valley Radio Observatory (OVRO). The VLA and OVRO surveys are fully described in Bravo–Alfaro et al. (2000). We measured the H I column density and compared this with the empirical threshold for star formation, i.e., the minimum gas column density necessary for star formation to occur, commonly believed to be around 10^{21} atom cm^{-2} (see e.g., Taylor et al. 1994). We find that the neutral gas distributions of both galaxies show regions of high H I column density ($> 2{\times}10^{21}$ atom cm^{-2}) near the centers of the optical counterparts (see Fig. 1).

The CO(1–0) distribution for Haro 2 (superposed on the H I contours in Fig. 2) confirms that star formation is likely restricted to the central regions. However, higher resolution H I observations are needed to allow a detailed comparison with the CO. The H I and H_2 contents of Haro 2 are very similar, with values around 10^8 $M_\odot$. Interestingly, the molecular gas, as outlined by the CO map, shows an arclike feature running from SE to NW along the major axis of

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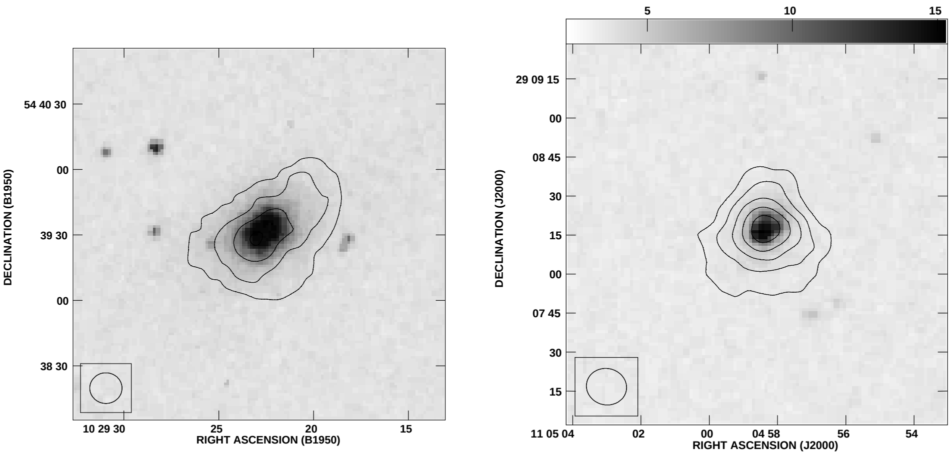

Figure 1. H I column density distribution of Haro 2 (left) and Haro 4 (right), superposed on DSS B–band greyscale images. For Haro 2 the contours are 1.2 (2.5 σ), 4.9, 9.8, 14.8, and 19.6×10^{20} cm^{-2}, and for Haro 4, 1.2 (2.5 σ), 4.7, 9.4, 14.0, and 18.7×10^{20} cm^{-2}. The FWHM is indicated in the lower left–hand corner and measures $15.5'' \times 14.0''$.

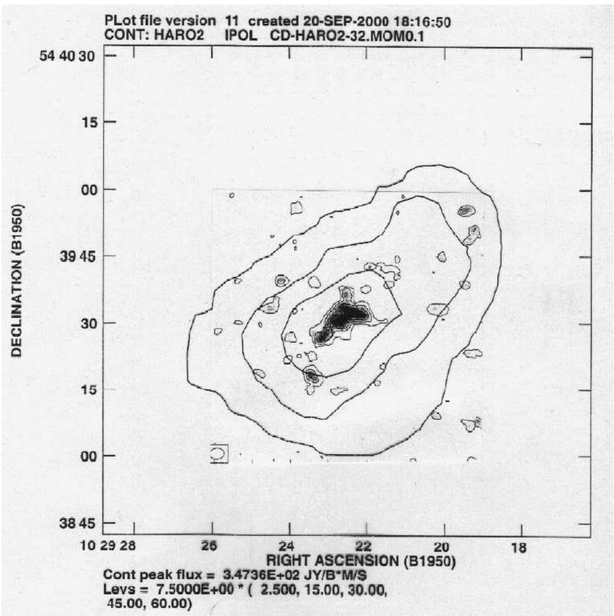

Figure 2. Zeroth moment map of the CO(1–0) emission of Haro 2 shown in grey scale and thin contour lines, which are drawn at multiples of $1.5\sigma_{ch}\Delta v_{ch}(n_{ch})^{0.5}$ (0.52 Jy beam^{-1} km s^{-1}). The FWHM is indicated by the ellipse and measures $3.26'' \times 2.64''$. The large–scale contours outline the H I as in Fig. 1.

both the H I and optical light distributions. However, this is *perpendicular* to the kinematic major axis defined by the velocity field of the H I data.

References

Bravo–Alfaro H., Brinks, E., Baker, A.J., & Kunth, D. 2000 (in preparation)

Taylor, C.L., Brinks, E., Pogge, R.W., & Skillman, E.D. 1994, AJ, 107, 971