RevMexAA (Serie de Conferencias), **15**, 200–200 (2003)

HD 192281 AND HD 10125: A STUDY OF THEIR LOCAL ISM USING RADIO AND INFRARED DATA

E. M. Arnal,[1,2] S. Cichowolski,[1] C. Cappa,[1,2] S. Pineault,[3] and N. St-Louis[4]

Massive stars like HD 192281 (O5 V n((f))p) and HD 10125 (O9 5 Ib or O9.7 II) have a substantial impact on their surrounding interstellar medium (ISM) via their high Lyman continuum flux and their strong stellar winds.

The first complete theoretical study of the interaction between a stellar wind and the surrounding interstellar medium (ISM) was made by Castor, McCray, & Weaver (1975). They predicted the creation around the massive star of a highly evacuated ($n \simeq 10^{-2}$ to $10^{-3}\,\mathrm{cm}^{-3}$) and hot ($T \simeq 10^6$ to $10^7\,\mathrm{K}$) spherical region surrounded by an expanding outer shell. In the case when ionization front gets trapped within the surrounding shell, its outer portions will recombine and eventually become observable in the line radiation emitted by atoms and molecules. Infrared emission emitted by heated dust grains is also expected to arise from the expanding shell. This overall structure is usually referred to as an *interstellar bubble* (IB).

Using high angular resolution neutral hydrogen (H I) line data and 408 and 1420 MHz continuum data obtained with the DRAO Synthesis Telescope, along with *IRAS* HIRES images at 60 and 100 μm, and single dish radio continuum observations at 2695, 4850 and 8350 MHz, a study of the properties of the ISM local to both stars was carried out.

In the case of HD 192281, $(l, b) = (77\overset{\circ}{.}12, +3\overset{\circ}{.}40)$, two H I structures centred at a radial velocity of $v_1 = -0.6\,\mathrm{km\,s^{-1}}$ and $v_2 = -10.2\,\mathrm{km\,s^{-1}}$, respectively, are likely to be the observable H I counterpart of an IB. In Figure 1 the oblong structure detected at high negative radial velocities is shown. The structure departs from spherical symmetry due to the high spatial velocity , V_{sp}, of the star (Weaver et al. 1977). A lower limit of $V_{\mathrm{sp}} = 58 \pm 13\,\mathrm{km\,s^{-1}}$ is derived from its proper motions (Hog et al. 1998), assuming a distance of 1.5 kpc. The low velocity H I feature is roughly semi-spherical, and has a counterpart at radio continuum, infrared and carbon monoxide (CO $= J \to 0$) frequencies.

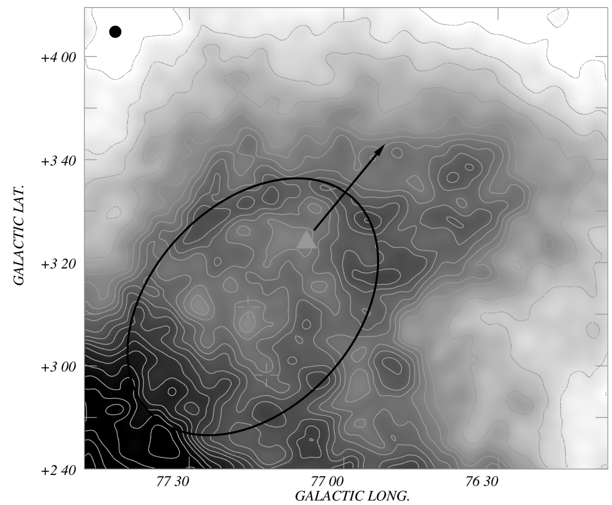

Fig. 1. H I brightness temperature distribution towards HD 192281 (gray filled triangle) in the velocity range -14.7 to $-5.6\,\mathrm{km\,s^{-1}}$. The ellipse delineates the oblong H I structure. The direction of the stellar proper motion is given by the arrow. The dot in the upper left corner of the figure represents the H I half power beam width (HPBW $\simeq 3'$).

On the other hand, HD 10125, $(l, b) = (128\overset{\circ}{.}89, +1\overset{\circ}{.}82)$, has an arc-like structure of H I associated with it. This feature is located some $20'$ from the star (towards lower Galactic longitudes) an has a mean radial velocity of $-30\,\mathrm{km\,s^{-1}}$. The arc-like feature is also observable at radio-continuum and infrared wavelengths. From the observed flux densities, the continuum emission is likely to be thermal in nature.

[1]Instituto Argentino de Radioastronomía, C.C. No 5, 1894 Villa Elisa, Argentina (arnal@iar.unlp.edu.ar).
[2]Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, Av. Paseo del Bosque s/n, 1900 La Plata, Argentina.
[3]Département de Physique et Observatoire du Mont Mégantic, Université Laval, Québec, Canada G1K 7P4.
[4]Département de Physique et Observatoire du Mont Mégantic, Université Montréal, Canada.

REFERENCES

Castor, J. I., McCray, R., & Weaver, R. 1975, ApJ, 200, L107
Hog, E., et al. 1998, A&A, 335, L65
Weaver, R., McCray, R., Castor, J., Shapiro, P., & Moore, R. 1977, ApJ, 218, 37