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THE NEW HI SUPERSHELL GS263-02+45 AND THE OB ASSOCIATION BOCHUM 7: CLOSE RELATIVES?

M. A. Corti[1,2] and E. M. Arnal[1,3]

Neutral hydrogen (HI) supershells are usually identified, in a given velocity range, as a brightness temperature minimum in the HI distribution that is surrounded by walls of HI emission. McClure-Griffiths et al.(2002) reported the discovery of GSH263+00+47, centered at (l,b) = ($263^{\circ}\!.0$, $0^{\circ}\!.0$). The OB association Bochum 7 (l,b) = ($265^{\circ}\!.0$, $-2^{\circ}\!.0$) is seen in projection onto the outer border of GSH263+00+47 (see Figure 1).

In order to further explore the possibility that both objects were somehow related to each other, we studied in more detail the large scale HI distribution in the area. Bearing in mind the baricentral radial velocity of GSH263+00+47, V = 47 km s^{-1}, and its velocity coverage, ΔV = 26 km s^{-1}, we studied the HI distribution spanning the velocity range from about 30 to 60 km s^{-1}. The large shell shown in Figure 1 by a dashed line has a mean radial velocity of 45 km s^{-1}and spans a velocity range of 10 km s^{-1}. A least square fit of a circumference to the HI peaks defining the shape of the large HI shell is shown as a thin dashed line. The center of this circumference lies at (l,b) = ($262^{\circ}\!.6$, $-1^{\circ}\!.8$) and has an angular radius of $3^{\circ}\!.6 \pm 0^{\circ}\!.4$. This large shell is designated GS263-02+45 (see Figure 1). The baricentral radial velocity of Bochum 7 (44 ± 10 km s^{-1}) (Corti et al. 2003) is similar (within errors) to the baricentral velocity of GS263-02+45. The kinematic distance of GS263-02+45 (5.3 ± 1.0 kpc) is compatible with the spectrophotometric distance of Bochum 7 (4.5 ± 0.6 kpc) (Corti 2005). The total mass of the supershell is $1.5 \times 10^6 M_{\odot}$ and its average volume density is ~ 0.5 cm^{-3}. Bearing in mind the total mass and the expansion velocity of GS263-02+45, its kinetic energy is (0.5–3) $\times$ 10^{51} erg. If GS263-02+45 was created by the stellar winds of a stellar aggregate located in its centroid, its dynamic age would be in the range (1.3–3.0) $\times$ 10^7 yr. In this way, GS263-02+45 would be older than Bochum 7 [(2.0–7.0) $\times$ 10^6yr].

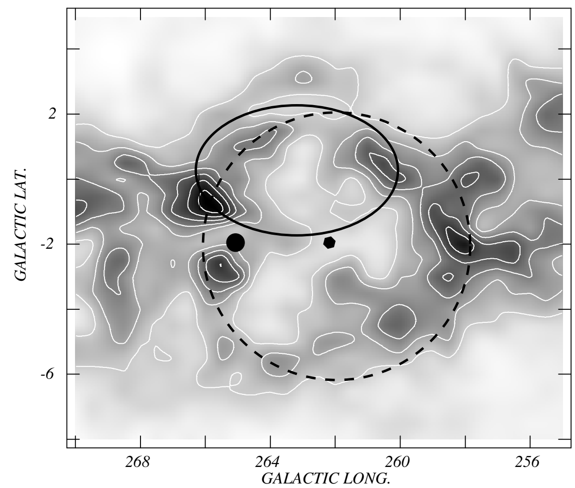

Fig. 1. Grey-scale representation of the mean brightness temperature of HI at 47 km s^{-1}. The dashed circumference represents GS263-02+45 with its geometric center shown as a black hexagon. The thin ellipse shows the location of GSH263+00+47. The position of Bochum 7 is indicated by a black dot.

Remarkably enough Bochum 7 is observed projected onto a region of the shell defining GS263-02+45 depicting a relative minimum in its HI distribution. Since both Bochum 7 and GS263-02+45 may be located at a similar distance, the HI minimum around de OB association might be a consequence of the interaction of the massive stars of Bochum 7 (via their stellar winds) with GS263-02+45. The proper motion of the stars of Bochum 7, within their large errors, do not preclude an outward proper motion with respect to the center of GS263-02+45. This fact provides extra support to the hypothesis of a physical link between Bochum 7 and GS263-02+45.

Based on the arguments (distance, age, interaction, proper motion) mentioned above, it is likely that the formation of Bochum 7 may have been triggered by GS263-02+45.

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[1]Facultad de Ciencias Astronómicas y Geofísicas, U.N. La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina (mariela@fcaglp.unlp.edu.ar).

[2]Instituto de Astrofísica de La Plata, CONICET, Argentina.

[3]Instituto Argentino de Radioastronomía, Argentina.