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MULTIWAVELENGTH STUDY OF RCW 108 AS A MASSIVE STAR FORMING REGION

G. A. Romero,[1,2] R. H. Barbá,[3] and E. M. Arnal[1,2]

NGC 6193 is an open cluster embedded in an HII region (RCW 108, Rodgers et al. 1960) located 15′ eastwards of NGC 6188. The later is a bright rimmed cloud that stretches over 30′ in the north-south direction, and marks the interface between RCW 108 and nearby dark clouds. RCW 108 is being powered by the multiple O-type star systems, namely HD 150135-HD 150136 (Niemela & Gamen 2005) in the core of NGC 6193. The UV photons emitted by these stars may drive photoionization-induced shocks into the nearby molecular clouds, possibly originating the well studied infrared cluster RCW108-IR (Comerón et al. 2005, and references therein). In this work we describe the morphology of the distribution of the photoionized and shock-excited gas based on Hα, [O III] and [S II] images, ^{13}CO observations, and infrared data (2MASS, MSX).

The spatial distribution of dust (Band A from MSX satellite, HPBW:18″) and molecular gas (^{13}CO(1-0), HPBW:2.′7) are shown in Figure 1. No infrared emission is detected between NGC 6193 and NGC 6188, suggesting that the cluster has swept the dust. In this region the maximum [OIII]/Hα line ratio (0.24 ± 0.05) is observed.

There are knots of warm dust along the image which are related to molecular gas associated with RCW 108. This gas shows ^{13}CO emission with radial velocities in the range [−30,−20] km s^{-1} (Romero 2006). These structures depict the highest values [S II]/Hα (0.22 ± 0.04) over the entire surveyed area. This high [S II]/Hα line ratio usually pinpoints to interface between molecular and ionized gas, the so-called photodissociation regions (PDRs). In this way four PDRs have been identified in this region: one with a blister morphology seen to the northeast of NGC 6188 (A), a semi-annular structure southwards of NGC 6193 (B), other associated with both NGC 6188 and RCW 108-IR (see Comerón et al. 2005), and finally, one situated westwards to NGC 6188 where the dark cloud Sandqvist 182 is present (D). Based on the analysis of near infrared colour diagrams using data retrieved from 2MASS and MSX point sources catalogues, all of the PDRs are associated with sources candidates to be young stellar objects. For the case of Structure D, a young stellar cluster may be embedded in the molecular cloud.

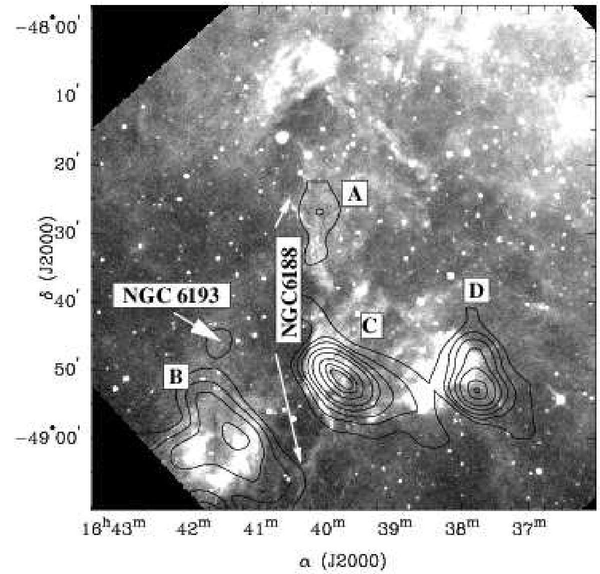

Fig. 1. Overlay of the MSX A-band emission (8 μm, grey-scale image) and the ^{13}CO emission (contour lines) associated with RCW 108. The objects referred to in the text are marked in this figure.

These results indicate that the star-forming process in the region of RCW 108 is a much more widespread phenomenon that previously thought.

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[1] Instituto Argentino de Radioastronomía, Casilla de Correo No 5, 1894 Villa Elisa, Provincia de Buenos Aires, Argentina (gisela@iar.unlp.edu.ar).

[2] Facultad de Ciencias Astronómicas y Geofísicas, Paseo del Bosque S/N, B1900FWA La Plata, Provincia de Buenos Aires, Argentina.

[3] Universidad de La Serena, La Serena, Chile.