RevMexAA (Serie de Conferencias), **40**, 297–297 (2011)

H110α AND C110α EMISSION TOWARD THE PHOTODISSOCIATED REGION IN THE GGD14 COMPLEX

S. P. Treviño-Morales,[1] Y. Gómez,[1] C. A. Rodríguez-Rico,[2] G. Garay,[3] L. F. Rodríguez,[1] and Á. Sánchez-Monge[4]

In this work we present high angular resolution observation of the C110α radio recombination line (RRL) to study the photodissociated region (PDR) associated with the H II region of cometary morphology (VLA 1) in the GGD14 complex.

The GGD14 region is located in an active star-forming region embedded in the Monoceros molecular cloud at a distance of ∼1 kpc (Rodríguez et al. 1980). This region contains an HII region (VLA 1) that seems to be ionized by a B0.5 ZAMS star (Gómez et al. 1998, 2000), a bipolar CO outflow (Rodríguez et al. 1982), and a cluster of water masers centered on the powering source of the molecular outflow (Tofani et al. 1995), which is located ∼30″ to the northwest of the HII region. Gómez et al. 1998 has reported C92α emission arising from an extended region of ∼20″ in size that is closely associated with the HII region. The C92α is interpreted as arising from a PDR around the HII region. Recently, Gómez et al. (2010) reported an expanding HI 21 cm champagne flow, with a size ten times larger than the HII region, suggesting that the neutral gas is expanding in a similar way as the ionized gas.

The H110α and C110α RRLs at 4.87 GHz were observed with the Very Large Array (VLA) in its C configuration. Data reduction was performed following the procedures for high frequency data of the software package AIPS. Both lines were detected, imaged and self-calibrated using the continuum emission, obtaining images with a synthesized beam of $7.''8 \times 5.''0$ at PA $= -16°$, and a rms noise of 1.41 mJy beam^{-1} per 0.75 km s^{-1} channel.

In Figure 1, we show the zero-order moment (integrated intensity) maps of both RRLs. We have spatially resolved the PDR surrounding the HII region in GGD14. We find that the C110α line emission exhibits an extended arc structure that extends to the NW in between the HII region and the molecular gas, suggesting the presence of a high density PDR, while the HI 21 cm line emission extends from the NW to SE, likely a low density PDR (Gómez et al. 2010). This PDR structure is different to that expected from the Hollenbach & Tielens (1997) theoretical models.

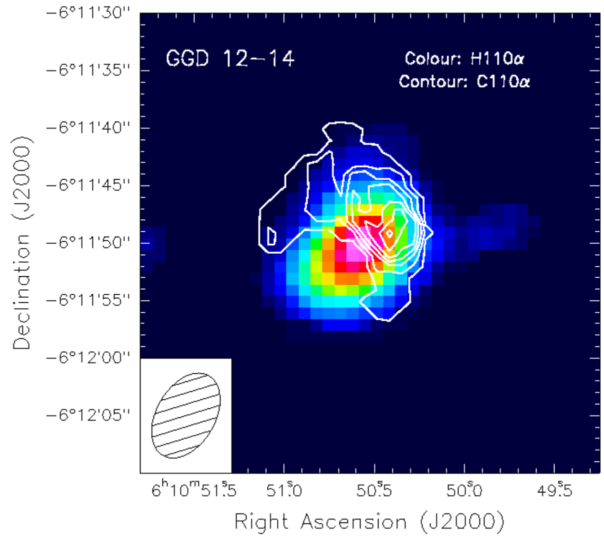

Fig. 1. H110α line emission (color scale) and C110α line emission (white contours). Figure from Treviño-Morales, S., et al. (2011, in preparation).

In future work we will characterize the spectral line emission associated with the ionized gas, the PDR and the molecular cloud. The results obtained with this work could be a starting point for future research with ALMA.

[1]Centro de Radioastronomía y Astrofísica, Universidad Nacional Autónoma de México, Apdo. Postal 3-72, 58090 Morelia, Michoacán, Mexico (s.trevino@crya.unam.mx).

[2]Departamento de Astronomía, Universidad de Guanajuato, Guanajuato, Mexico.

[3]Departamento de Astronomía, Universidad de Chile, Santiago, Chile.

[4]Departament d'Astronomia i Meteorologia, Universitat de Barcelona, Spain.

REFERENCES

Gómez, Y., et al. 2010, AJ, 140, 913
Gómez, Y., et al. 1998, ApJ, 503, 297
Gómez, Y., et al. 2000, RevMexAA, 36, 161
Hollenbach, D. J., & Tielens, A. G. G. M. 1997, ARA&A, 35, 179
Rodríguez, L. F., et al. 1982, ApJ, 260, 635
Rodríguez, L. F., et al. 1980, ApJ, 235, 845
Tofani, G., et al. 1995, A&AS, 112, 299