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STUDY OF YOUNG STELLAR CLUSTERS IN THE NEBULAR COMPLEX NGC6357 WITH VVV

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In this work we study the nature of a series of star clusters embedded or projected towards the complex of HII regions and molecular clouds NGC 6357.

NGC 6357 (≡ W 22 ≡ RCW 131 ≡ Sh2–11) is a large HII region complex that consists of a shell of about 60 × 40 arcmin², bright optical nebulosities in different evolutionary stages, OB stars belonging to the massive open cluster Pismis 24 and young stellar object (YSO) candidates (Russeil et al. 2010, Cappa et al. 2011).

A range of distances (1.1 – 2.6 kpc) has been derived for NGC 6357. This is usually estimated from the distance of Pismis 24. Its most recent determination is 1.7±0.2 kpc (Fang et al. 2012).

To disentangle field and cluster stars we use a statistical decontamination algorithm described in detail in Bonatto & Bica (2007) and adapted to the photometric depth of VVV. To replace VVV saturated stars we used 2MASS photometry. Fundamental parameters are derived by means of the constraints provided by the field-decontaminated color-magnitude diagram (CMD) morphologies combining the MS and PMS star distributions (e.g. Fig. 1). Historically, different approaches have been used to extract astrophysical parameters from isochrone fits. In this work fits are made by eye, taking the combined MS and PMS stellar distribution as constraint. We work with PARSEC isochrones (solar metallicity) computed with the VISTA Z, Y, J, H and K₄ filters to derive the fundamental parameters.

From the clusters belonging to the complex we derived a mean distance of d☉=1.76±0.1 kpc.

We conclude that NGC 6357 has had at least two stellar generation events, within the range of 5 to 9 Myr. This age difference may help to understand the star forming history of the complex.

REFERENCES