

Multiwavelength study of HII region IC 1805

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Abstract

IC 1805 is a giant HII region which harbors several massive stars and bright-rimmed clouds (BRCs) at the periphery. This complex is an interesting candidate to study the young stellar objects (YSOs) and influence of massive stars on their neighborhood. We present the results of our optical and archival near-far infrared studies of the region. The spatial distribution of YSOs selected based on the near-far infrared photometry suggests propagating star formation in the region. The spectral energy distribution of the sources inside the BRCs reveals that they are mainly intermediate-high mass stars. We also report a embedded YSO cluster slightly off the apex of one of the BRCs.

Introduction

IC 1805 ($l=134.73$, $b=0.92$), also known as W4 HII region, is located at the Galactic plane apex. The region is illuminated by the massive stars located near the center of the HII region and are members of the open cluster Melotte 15. Massey et al. (1995) found nearly 15 massive members in the region. In literature, distance estimates for the region, ranges from 1.9 Kpc – 2.4 Kpc. The region consists of intricate structures; finger tips, bright rims, cometary globules, elephant trunks like features, pointing towards the direction of massive star(s), which are more clear in the mid/far-infrared images and are the results of the interaction of strong UV radiation and stellar winds from the massive stars with the natal molecular cloud.

Our aim is to investigate the influence of massive star(s) on further star formation activity and to characterize the YSO population in the region.

Results

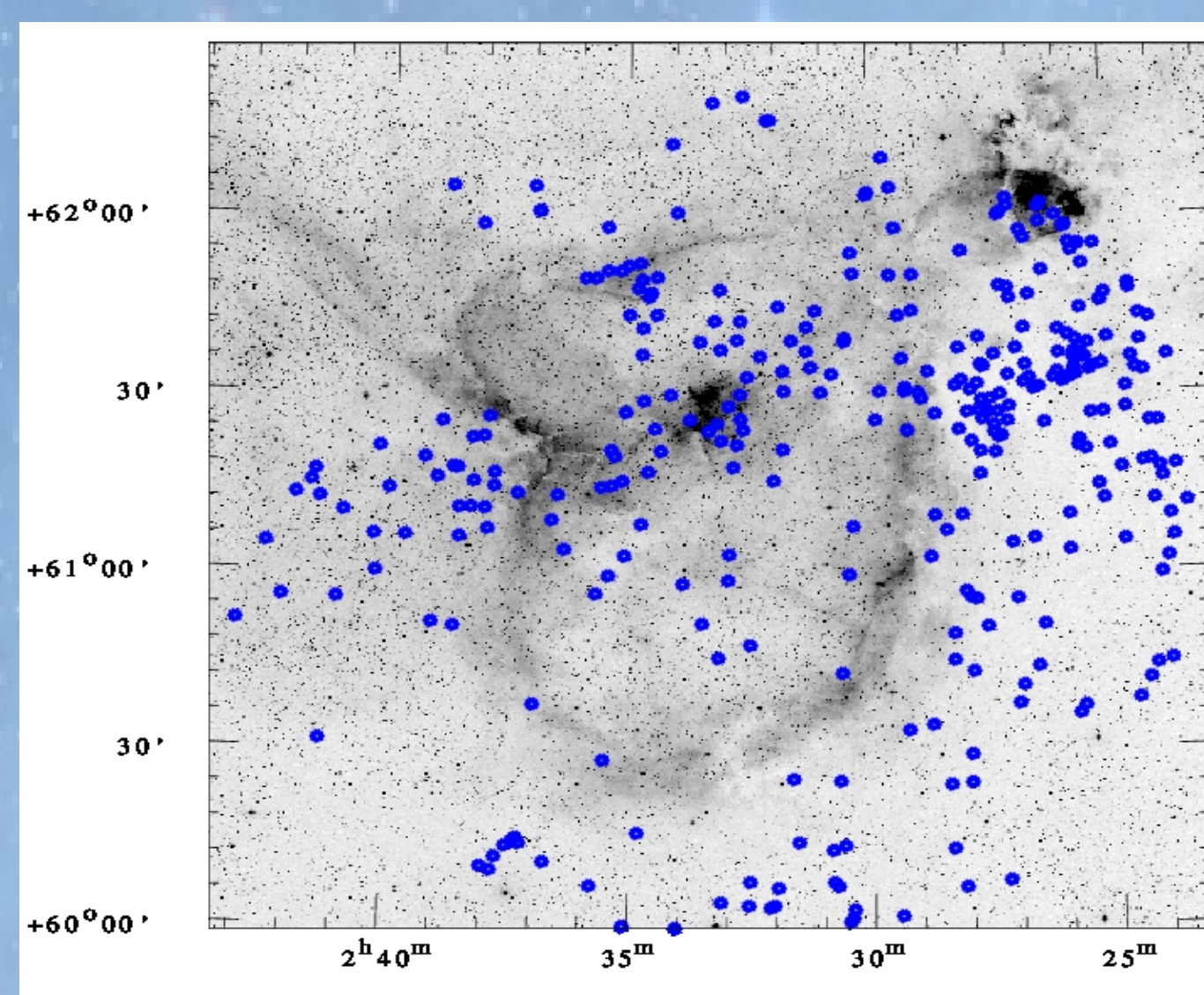


Fig. 2. Spatial distribution of near infrared excess stars selected from 2MASS database

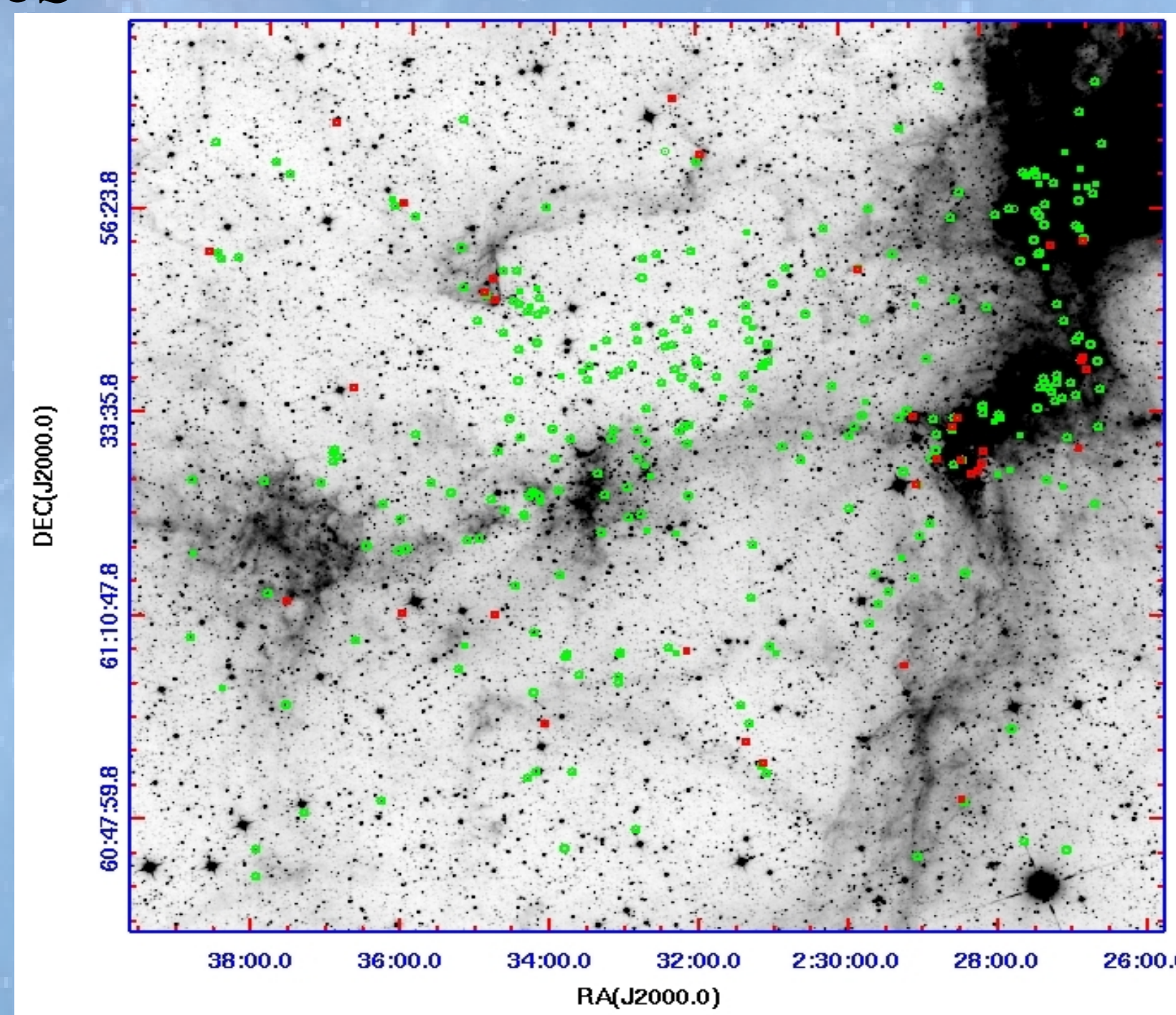


Fig. 3 Spatial distribution of YSO candidates identified from WISE data (adopting the procedure described in Koenig et al. 2012) overlaid on 4.6 μm image. The red circles are Class I and green are Class II sources, respectively.

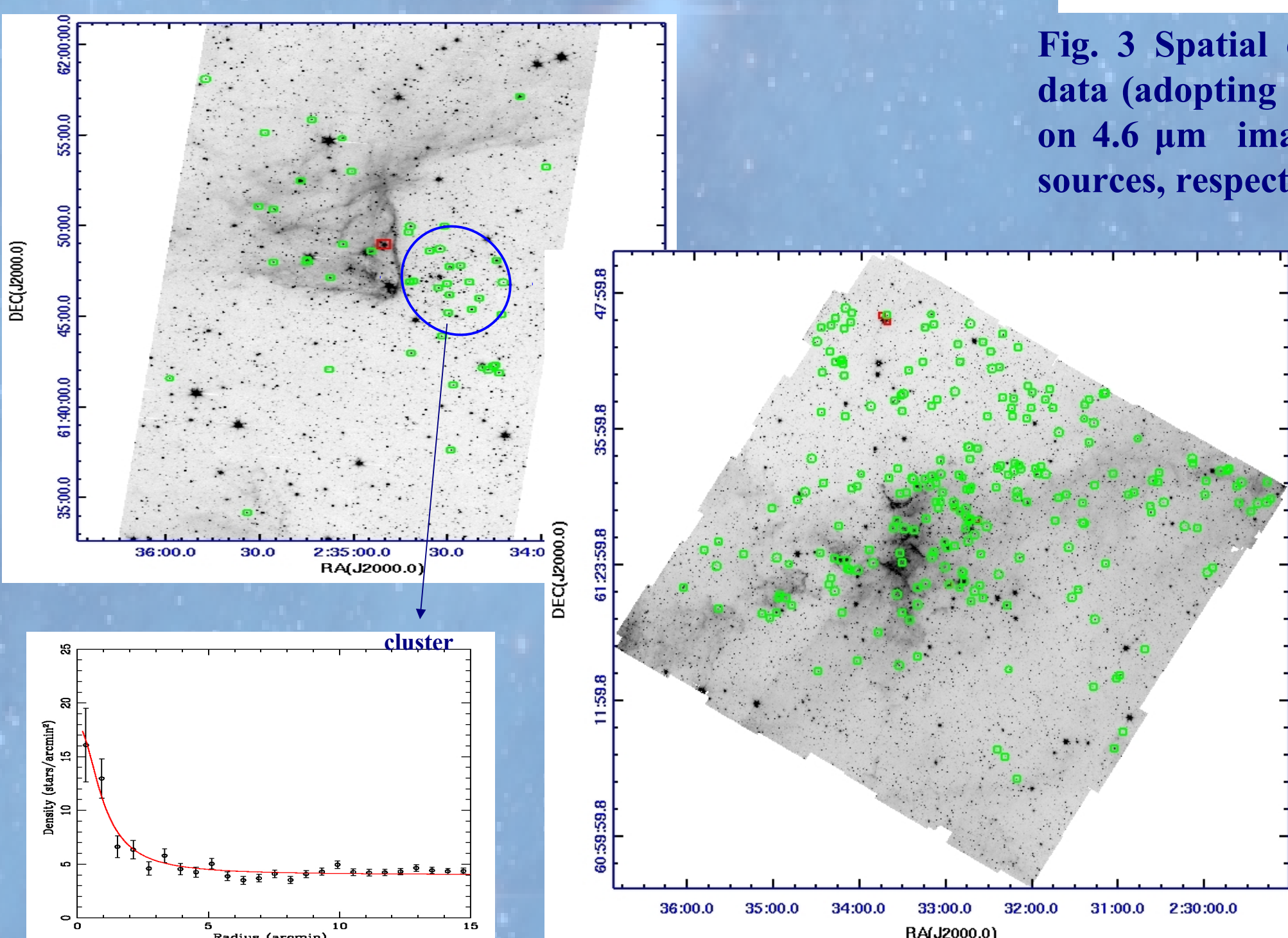


Fig.4 Spatial distribution of probable PMS candidates identified from IRAC data (using the criteria given in Gutermuth et al. 2009) marked on the 4.5 μm IRAC image. The red sources are Class I and green are Class II sources, respectively.

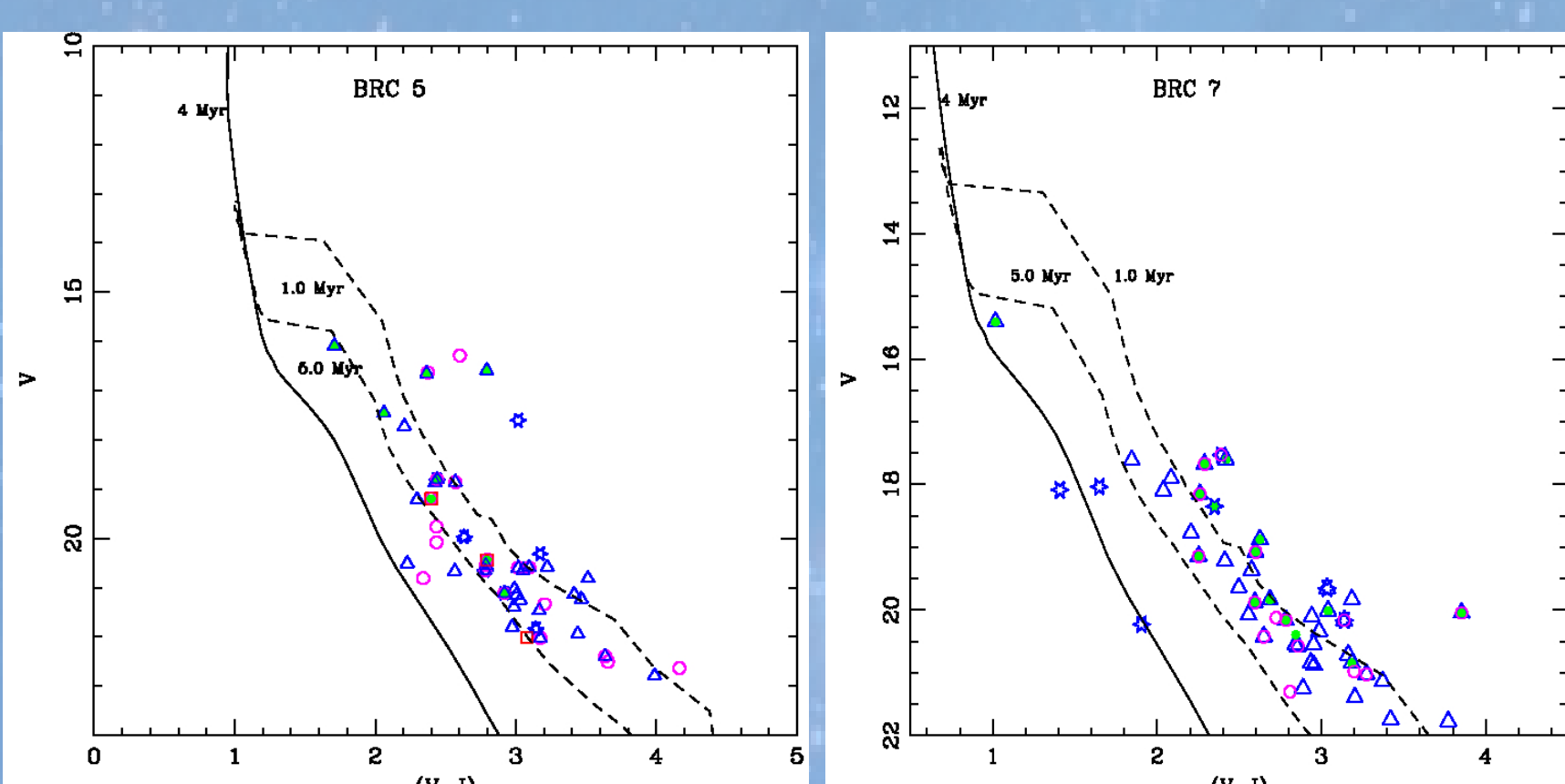


Fig. 5. (V-I)/V color-magnitude diagram of the candidate PMS sources (star: H α ; triangle: Class II; magenta: NIR excess sources; red square: Class I sources). The solid and dashed curves are the ZAMS from Girardi et al. (2002), and PMS isochrones of 1.0, 5 Myr respectively from Siess et al. (2000).

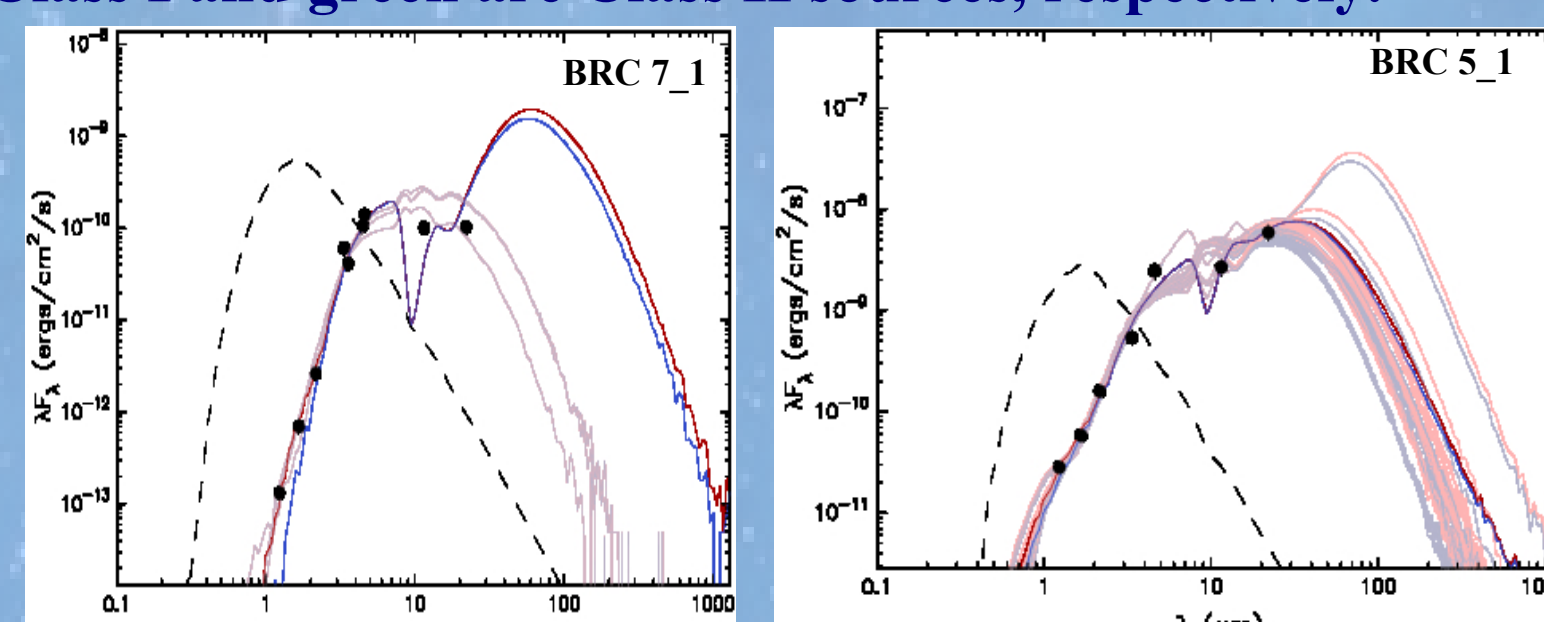


Fig. 6. SEDs for the class I sources inside the BRCs 7 and 5. The solid line shows the best fit and the grey lines show the subsequent well fits. The dashed line shows the stellar photosphere corresponding to the central source of the best fitting model.

source	chi ²	mass($M_{\odot}$)	Age(My)
BRC7_1	59.50	~8.09	<0.1
BRC5_1	10.69	~9.50	<0.1

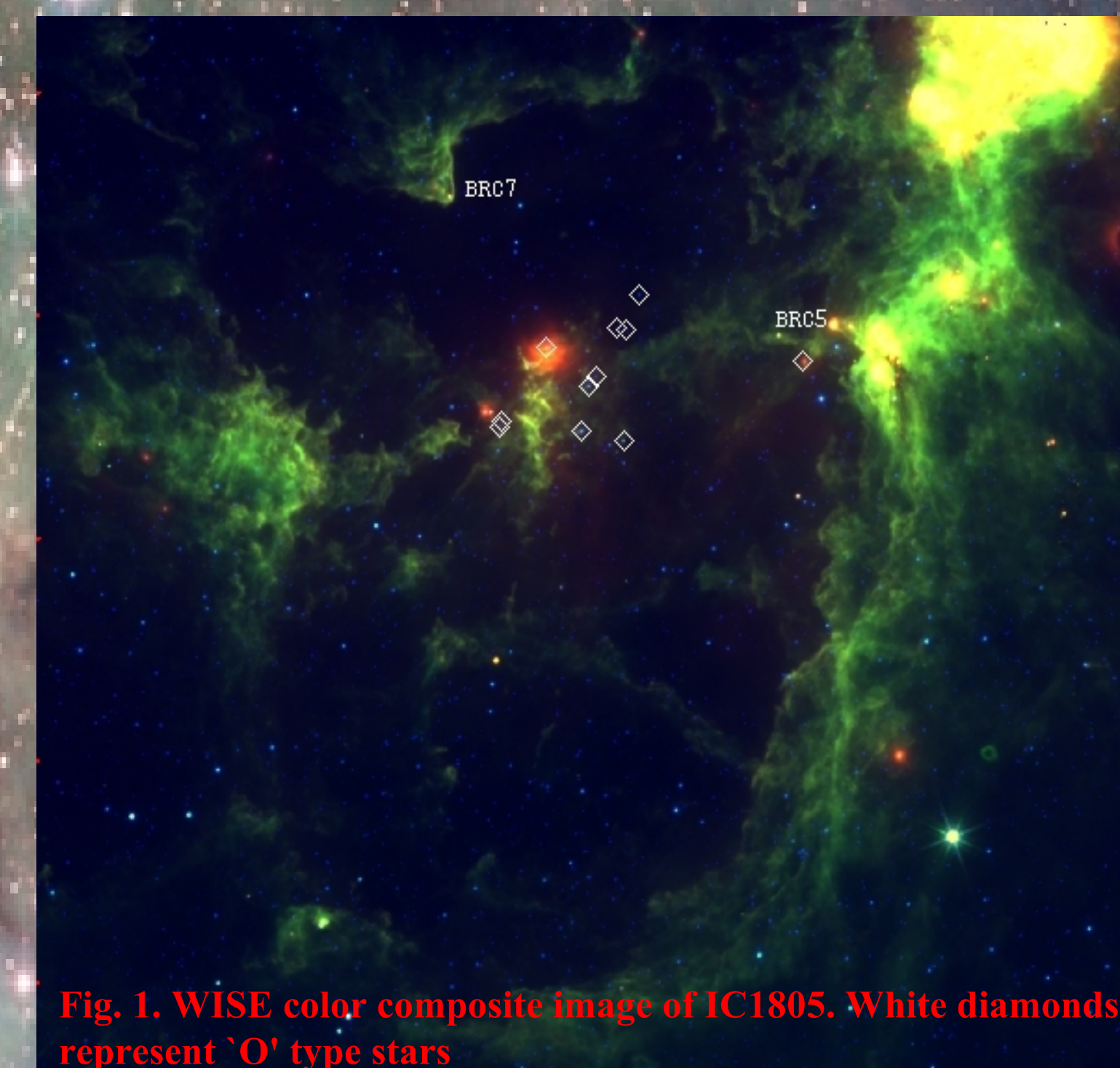


Fig. 1. WISE color composite image of IC1805. White diamonds represent 'O' type stars

OBSERVATIONS

VI observations from 1-m ST, ARIES

Archival Data

Near infrared (NIR) data: from 2MASS

Mid infrared (MIR) data: from Spitzer space telescope in all IRAC bands for the central region of IC 1805

IRAC [3.6] and [4.5] observations

For BRC 5 & BRC 7

and

WISE data at 3.4, 4.6, 12 and 22 μm

SUMMARY

- The spatial distribution of the YSOs identified from various data sets indicates an asymmetric and aligned distribution.
- Most of the class I sources are still embedded inside the cloud while class II sources are non-homogeneously distributed.
- Clouds with bright rim, BRCs 5 and 7 have class I sources just inside their heads and the SED fitting (Robitaille et al. 2007) indicates that they are very young stars with intermediate/ high mass.
- We found a clustering of YSOs near the apex of BRC7. Using the Ks band data from 2MASS, we found that the radial extent of the cluster is ~ 5 arcmin.
- Deep optical VI photometry of the two BRCs indicates that most of the identified YSOs are young.

ACKNOWLEDGMENT

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REFERENCES

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