

# SEARCH FOR CLUSTER CANDIDATES IN THE UKIDSS DATABASE



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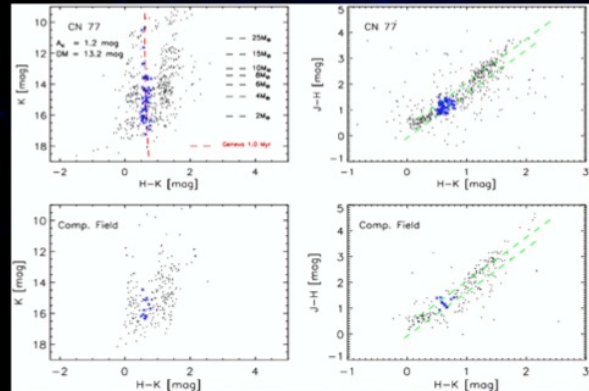


## Abstract

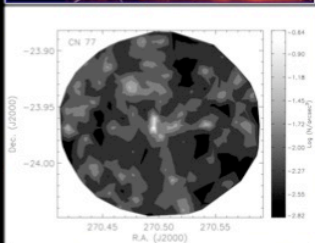
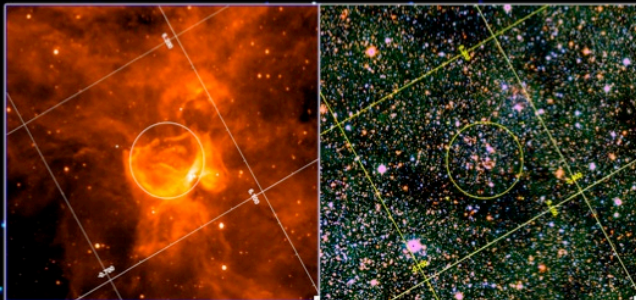
UKIDSS GPS is a deep and high angular resolution survey of the Galactic plane in the J, H and Ks bands. Using this survey we searched the inner region of the Galaxy ( $|l| < 10^\circ$ ) for young cluster candidates associated with Molecular Bubbles (MBs).

The latter are observed in the mid infrared survey GLIMPSE II. The underlying idea is that MBs may be blown out by powerful sources, such as young O and B stars; some of the MBs in the sample are indeed associated with HII regions, a *hint* for the presence of young stars.

One of the major observational problems in the galactic plane is the high degree of interstellar absorption and its spatial variability. Big effort is also devoted in quantifying this issue.



Col-Mag and Col-Col diagrams for CN 77 and a comparison field of the same area. Blue dots are stars selected using a color-color cut.



The CN77 Molecular Bubble; 8  $\mu$ m IRAC channel (upper left), UKIDSS JHKs composite image (middle); stellar density map for sources with near infrared excess (right)

## Results & Discussion

Mass estimates for the three candidates are still quite uncertain, due to the uncertainty on the kinematic distance but also on reddening and total extinction.

To reduce this problem we are optimizing an existing technique which will allow us to obtain a distance-reddening relation by comparing the UKIDSS observed star counts per color bin to the counts predicted by a Synthetic model of Galactic Populations.

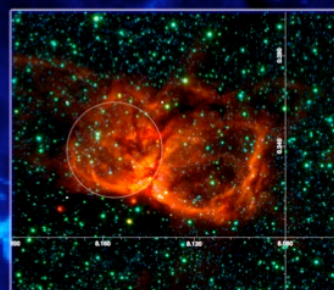
UKIDSS GPS catalog provides at the moment only aperture photometry. This may be a problem in the very crowded regions of the Galactic Plane. We are planning to perform PSF fitting photometry in some interesting fields; preliminary analysis has lead already to the identification of two other possible cluster candidates.

## Method

Color-color and color-magnitude diagrams as well as stellar density maps of the MBs regions have been studied, looking for enhancements in the star counts, compared to nearby reference fields.

Three candidates have been found for which the Upper Main Sequence has been used to estimate the reddening. Age of the cluster candidates is in the range 1-5 Myr. Kinematic distances are available from radial velocities measurements of the associated HII regions.

With information on distance, age, reddening (and hence extinction) we were able to fit isochrones to the clusters sequence and give a first estimate of their total mass, assuming a Kroupa IMF.



Composite image of the CN 107/109 bubbles. Red: IRAC 8  $\mu$ m; Green: IRAC 3.6  $\mu$ m; Blue: UKIDSS Ks.

## References

- Churchwell et al. 2007, ApJ, 670, 428
- Lejeune & Schaerer 2001, A&A, 366, 538
- Lucas et al. 2008, MNRAS, 391, 136
- Marshall et al. 2006, A&A, 453, 635



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