

Discovery of an Extraordinarily Massive Cluster of Red Supergiants

Donald F. Figer, John MacKenty, Massimo Robberto, Kester Smith, Francisco Najarro, Rolf P. Kudritzki, and Artemio Herrero

RIT, STScI, STScI, STScI, CSIC, UH, IAC

We report the discovery of an extraordinarily massive young cluster of stars in the Galaxy, having an inferred total initial cluster mass comparable to the most massive young clusters in the Galaxy. Using *IRMOSS*, *2MASS*, and *Spitzer* observations, we conclude that there are 14 red supergiants in the cluster, compared with five, in what was previously thought to be the richest Galactic cluster of such stars. We infer spectral types from near-infrared spectra that reveal deep CO bandhead absorption that can only be fit by red supergiants. We identify a gap of $\Delta K_s \sim 4$ magnitudes between the stars and the bulk of the other stars in the region that can only be fit by models if the brightest stars in the cluster are red supergiants. We estimate a distance of 5.8 kpc to the cluster by associating an OH maser with the envelope of one of the stars. We also identify a "yellow" supergiant of G6-I type in the cluster. Assuming a Salpeter IMF, we infer an initial cluster mass of 20,000 to 40,000 M_{sun} for cluster ages of 7-12 Myr. Continuing with these assumptions, we find 80% of the initial mass and 99% of the number of stars remain at the present time. We associate the cluster with an x-ray source (detected by *ASCA* and *Einstein*), a recently discovered very high energy γ -ray source (detected by *INTEGRAL* and *HESS*), and several non-thermal radio sources, finding that these objects are likely related to recent supernovae in the cluster. In particular, we claim that the cluster has produced at least one recent supernova remnant with properties similar to the Crab nebula. It is not unlikely to find such a source in this cluster, given our estimated supernova rate of one per 40,000 to 80,000 yr.

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Comments:

Email: figer@cis.rit.edu