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VVV STUDY OF THE YOUNG MILKY WAY STAR CLUSTERS: MERCER 35, 69 AND 70

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We present here our first analysis of the young hidden clusters Mercer 35, 69 and 70 based on JHK_S photometry and near-IR spectroscopy, as part of our systematic study of the inner Milky Way cluster content.

Young massive clusters are usually deeply embedded in dust and gas. Wide-field infrared surveys are a modern tool for studying hidden clusters. "Vista variables in Vía Láctea - VVV" (Minniti et al. 2010) is an ESO/Chile/VISTA public deep near-IR survey, covering the Galactic Bulge and Southern Galactic disk where the star formation activity is high. VVV will take 1929 hours over the next five years covering around 10^9 point sources within an area of 520 sq deg, and is ideal for identifying and characterising such objects.

These results represent the latest step in our systematic study of the inner Milky Way cluster content (Borissova et al. 2003; Ivanov et al. 2002; Kurtev et al. 2007), based on VVV and SOFI/NTT JHK_S photometry and follow-up near-IR spectroscopy. In Table 1 and Figure 1a we summarise our CMD based photometric results, with the spectroscopic results given in Figure 1b.

These three investigated clusters are young ($t \leq 10$ Myr), and follow-up spectroscopy of some of the brightest probable cluster members show characteristics of supergiant stars. In the Milky Way there are only a few known massive clusters in the red supergiant phase. It is possible that clusters once thought to be of relatively low mass may in fact prove to be quite massive on further investigation. Therefore, perhaps other massive clusters await identification amongst the known examples (Figure 1).

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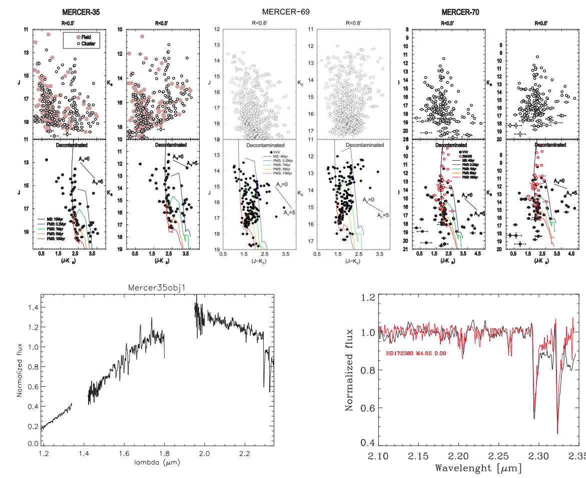

Fig. 1. (a) CMDs of the target clusters: as observed (top), statistically decontaminated (bottom). (b) The brightest star of the cluster Mercer 35 (Mercer et al. 2005) shows a typical red supergiant spectrum. The best match is the M4.5 II star HD172380. Spectra obtained from OSIRIS on SOAR.

TABLE 1

REDDENING AND CLUSTER POSITION

	Mercer 35	Mercer 69	Mercer 70
$E(J-K_S)$	2.4±0.1	1.5±0.1	2.0±0.1
A_V (mag)	15.1±0.5	9.5±0.5	12.8±0.5
$(m-M)_0$	14.0±0.5	13.4±0.5	13.0±0.5
dSun (kpc)	6.3±1.5	4.9±1.2	4.0±1.0
dGC (kpc)	6.8±1.1	4.5±0.9	5.0±0.8
x (kpc)	−4.4±0.9	−3.8±1.0	−4.5±0.8
y (kpc)	−5.2±1.2	−2.5±0.6	−2.0±0.5
z (pc)	9±2	41±10	40±10

All distances are assume $R_0 = 8.00$ kpc.

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