Overdensity of galaxies in the VVV survey

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ABSTRACT

the presence of 2 new galaxy cluster candidates in an area of 1.68 deg².

VVV DATA

Vista Variables in the Via Lactea is the Galactic near-IR ESO VISTA survey VISUAL DETECTION

AUTOMATIC DETECTION

We present the results obtained in the analysis of tile b204 of the infrared Our photometric multi-color catalog in the Ks, J, H bands was constructed VVV survey (VISTA Variables in the Milky Way). In this region of the sky we using SEXTRACTOR (Bertin & Arnouts 1996, A&AS, 117, 393) in doubleanalyzed the photometric data and the spatial distribution of a sample of image mode with the Ks image as a reference on account of its better quality. 800 objects with characteristics typical of galaxies, which were confirmed The photometric calibration was performed respect to the common objects with visually. We found 2 regions of significant overdensity whose red sequences CASU catalogs. For the extinction correction we used the procedure described are well defined in the color-magnitude diagram. This result would indicate in Gonzalez et al. (2011, A&A, 534, 3) adopting the Nishiyama et al. (2009, ApJ, 696, 1407) extinction law. We use objects fainter than Ks=12, to avoid the inclusion of saturated stars, and brighter than Ks=15 which corresponds to the completitud limit for this tile.

to map the Milky Way's bulge and a disk area close to the center of our We performed a visual identification of galaxies by using Aladin's tools from Galaxy. The VVV area covers ~562 deg² and is fully imaged in 5 the multicolor RGB image. The objects with morphological features and photometric bands: Z, Y, J, H, and Ks. A detailed description of the survey surface brightness corresponding to galaxies were identified as visual galaxy and the data can be found in Minniti et al. (2010, New A, 15, 433) and Saito candidates. et al. (2012, A&A, 537, A107). The observations were carried out with the VIRCAM camera on VISTA 4.1m located at ESO Cerro Paranal Observatory in Chile.

Star-galaxy separation



Fig. 1 shows CLASS_STAR parameter as a function of Ks magnitudes. From this figure we can see clearly two object stars defined with sequences: CLASS STAR ~ 1 and galaxies with CLASS STAR ~ 0. Taking this into account, we defined as galaxy candidates those objects with the conservative limit: CLASS_STAR < 0.5

Fig. 1: The star-galaxy separation vs. total magnitudes for Ks band. The vertical bar shows a color scale corresponding to the CLASS_STAR parameter.



Fig. 2 shows the half-light radius versus Ks magnitude. From the color scale corresponding to the CLASS_STAR parameter can be noticed that the majority of the objects with CLASS_STAR ~ 1 show a stellar locus clearly visible at $r_{1/2} < 0.5$ arcsec, while that sources with CLASS_STAR < 0.5 tend to have higher values for $r_{1/2}$.

Fig. 2: Ks magnitude vs. r1/2. The vertical bar shows a color scale corresponding to the CLASS_STAR parameter.

We define as galaxy candidates those objects with CLASS_STAR < 0.5 and $r_{1/2}$ > 0.7 arcsec

Data analysis



Fig. 3 shows the J-Ks color-magnitude diagram. The galaxy candidates occupy a particular position in the color-color diagram as shown in Fig. 4, consistent with the results from Amores et al. (2012, AJ, 144, 127) and Coldwell et al. (2014, A&A 569, A49)

Fig. 3: J-Ks vs. Ks diagram. The density map shows the whole sample of objects. The dots correspond to Type I and cross to Type II galaxy candidates, respectively.



Fig. 4 shows the (J-H)-(H-Ks) color-color diagram. The galaxy candidates occupy a particular position in the color-color diagram. These have both redder colors consistent with the results from Amores et al. (2012, AJ, 144, 127) and Coldwell et al. (2014, A&A 569, A49)

Fig. 4: J-H vs. H-Ks diagram. The density map shows the whole sample of objects. The dots correspond to Type I and cross to Type II galaxy candidates, respectively.

We have found 876 galaxy candidates which have been catalogued for the first time 222 present unclear morphology Type II

Fig. 6 and Fig. 8 show the J-Ks color-magnitude diagram. The galaxy cluster member candidates have CLASS_STAR ~ 0 and colors redder than J-Ks > 1.1. They are Type I galaxy candidates and they are spatially located in a projected compact region. The Fig. 5 shows a multicolor image with the 3 brightest galaxies and the Fig. 7 shows a multicolor image with the distribution of the 28 candidates for galaxy cluster.

Two new galaxy cluster candidates have been detected

