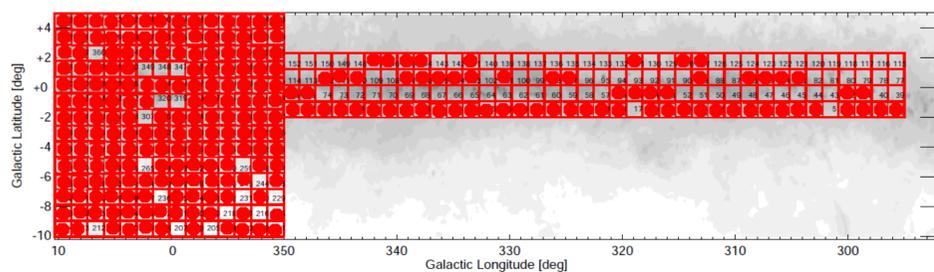


## VISTA-VVV

The ESO public survey VISTA Variables in the Vía Láctea (VVV) targets 562 square degrees in the Galactic Bulge and an adjacent plane region. VVV provides multi-epoch Ks-band images which allow searching for high proper motion objects. Providing better spatial resolution and deeper photometry (~4 magnitudes deeper than 2MASS), VVV has big potential of finding free floating very low-mass stars, brown dwarfs and also common proper motion companions of previously known high proper motion stars (Minniti et al. 2010, New Astronomy, 15, 433).

## CURRENT STATUS

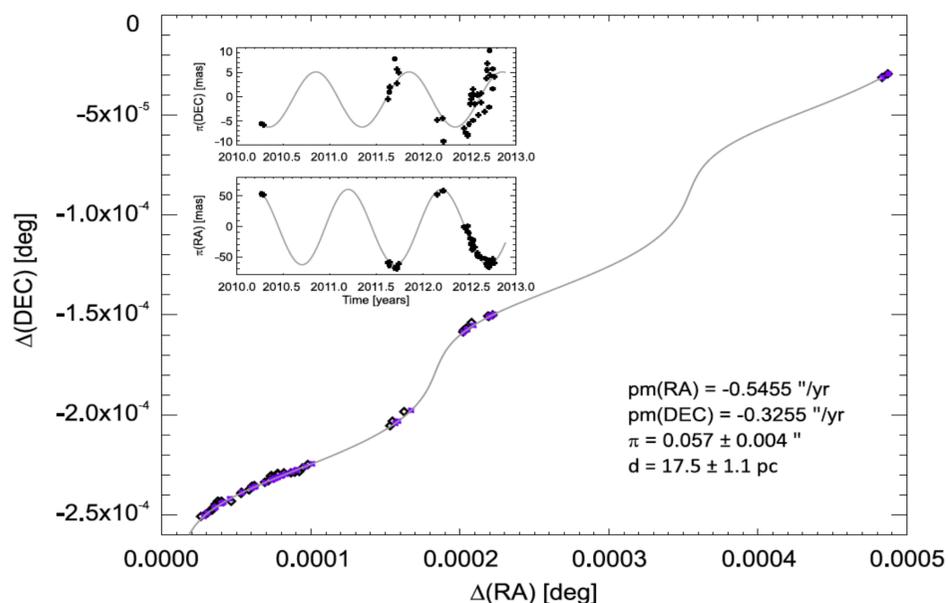
Until now we have examined ~71 % of VVV area and we have detected ~1000 objects with proper motion higher than 0.05 arcsec per year and Ks<13.5. This sample includes dozens of completely new high proper motion stars and common proper motion pairs, some common proper motions companions of previously known high proper motion stars, and one spectroscopically confirmed brown dwarf (Beamín et al., 2013, A&A, 557, L8). During visual inspection of SuperCOSMOS images we have also identified 3 white dwarf common proper motion companions of previously known high proper motion stars. Progress map is shown below.



## VVV BD001

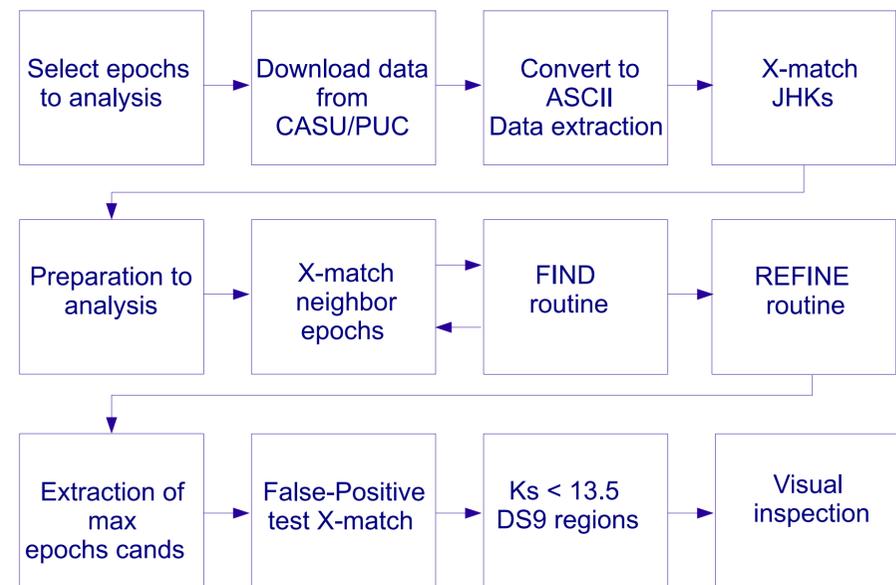
One of the results of these studies is discovery of "blue" L5 brown dwarf towards the Galactic center in one of the most crowded regions of the sky (Beamín et al., 2013). This object was previously observed by near-IR surveys (detection in 2MASS, DENIS and GLIMPSE) but has not been classified as a high proper motion object. VVV BD001 is not visible on SuperCOSMOS images. Spectral classification of VVV BD001 was made based on near-IR spectrum obtained with FIRE spectrograph at the 6.5 Magellan telescope at Las Campanas Observatory.

To obtain the parallax of the target, we used its equatorial coordinates on all available VVV images. Five bright, 13-14 mag, and isolated stars without proper motion around the target were used to obtain the corrections to a common field center for each epoch. Sequence of 41 positions, used for estimation of the proper motion and the parallax, was obtained by averaging corrected coordinates date-by-date. The best parallax and proper motion fit is given on the below figure.



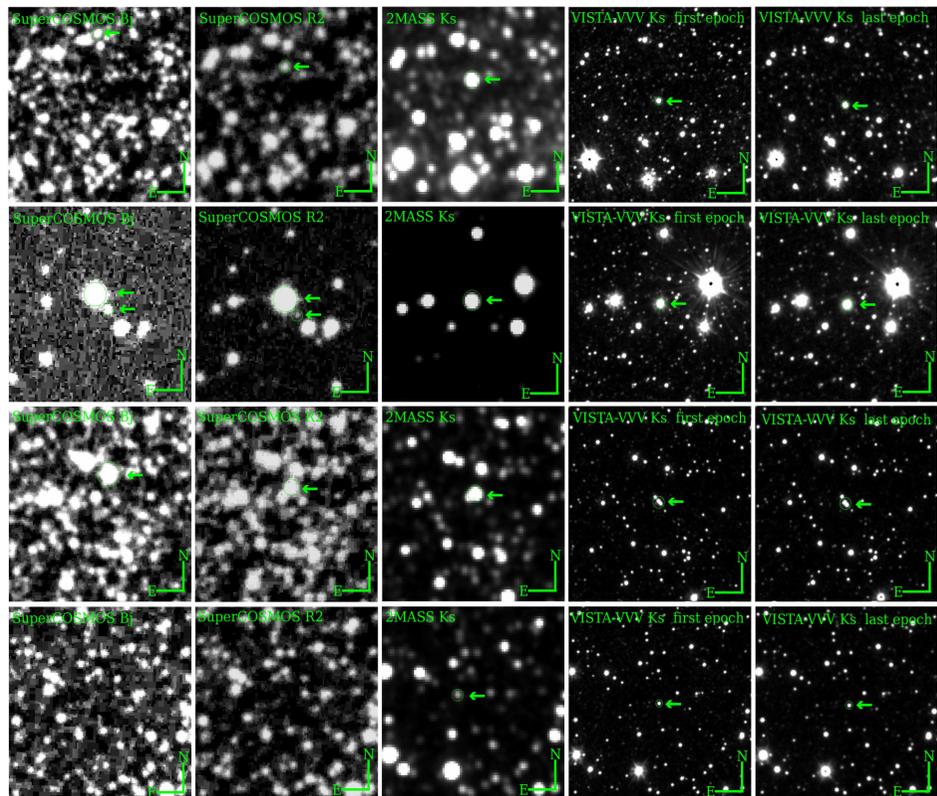
## METHOD

The searching method we used is based on cross-matching, with a scaled radius of 5 arcsec per year, photometric Ks-band CASU catalogs obtained for 4 different epochs. Next, the candidates were visually inspected on VVV and SuperCOSMOS images. Method was developed by Folkes et al. (in preparation). Flowchart of the used method is presented below.



## EXAMPLES

The examples of most interesting discoveries are shown below on SuperCOSMOS Bj and R2, 2MASS Ks and VISTA-VVV first and last Ks epochs images.



**Row 1:** High proper motion (0.81"/yr) M dwarf towards the Galactic Bulge. **Row 2:** MD+WD common proper motion binary, WD is visible only on SuperCOSMOS images (Bj=20.3, R2=21.1). **Row 3:** Close common proper motion MD+MD binary (d=1.6") resolved on VISTA-VVV images. **Row 4:** VVV BD001 towards the Galactic center, object is not visible on SuperCOSMOS images.