

THE GIGA-CMD OF THE VVV SURVEY

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The VISTA Variables in the Vía Láctea (VVV) survey has changed our picture of the inner Galaxy in the last years. Using the near-infrared images VVV provides, we have been able to build deep and homogeneous color-magnitude diagrams (CMDs) of the bulge and inner disk of the Milky Way, which contain around one billion sources. We are using these CMDs to learn about the physical parameters and structure of the central regions of our Galaxy, along with the extinction towards them.

The inner regions of our Galaxy are hidden behind a curtain of gas and dust, and their observations at visible wavelengths are severely hampered by this fact. Observations in the near-infrared are better suited due to the diminished effect of extinction at these wavelengths. VVV, one of the six ESO public surveys conducted with the 4m VISTA telescope in Paranal, has observed 562 square degrees of the Galactic bulge and an adjacent region of the southern disk in the *Z*, *Y*, *J*, *H*, and *K_s* near-infrared filters during the last 6 years (Minniti et al. 2010; Saito et al. 2010; Hempel et al. 2014).

Extracting the PSF photometry from the objects in the VVV images (Alonso-García et al. 2015), we have produced deep, homogeneous, and highly completed CMDs, containing nearly one billion sources located towards the central regions of the Milky Way. These CMDs provide us with an unprecedented view of the Galactic bulge and inner disc. We have begun to analyze them and have started to draw interesting implications in terms of the structure of the inner

Galaxy, and the stellar populations residing in it. Using the red-clump stars of the bulge identified from the CMDs, we obtained the first fully empirical estimate of the mass in stars and in remnants of the Galactic bulge ($2.0 \pm 0.3 \times 10^{10} M_{\odot}$; Valenti et al. 2016). We also used the shape of the red-clump distribution to reinforce the evidence for the X-shaped structure of the Galactic bulge (Gonzalez et al. 2015). And complementing our CMDs with the optical ones from the OGLE survey, we began to explore the behavior of the extinction towards low-latitude lines of sight and found the reddening to be large and non-canonical, differing significantly from commonly-used extinction laws for our Galaxy. In fact, we showed that variations in the shape of the extinction curve has at least two degrees of freedom, and not one (Nataf et al. 2016).

All of these important results are just but a small sample of the interesting conclusions we can extract from the VVV giga-CMDs we built, and further analysis is on its way.

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