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THE WIDE VIEW OF THE MILKY WAY BULGE FROM THE VVV SURVEY

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The first year of observations of the Galactic bulge in the Vista Variables in the Via lacteal (VVV) ESO Public Survey, with the VISTA telescope, have yielded a deep, near-infrared, multi-colour (Z,Y,J,H,Ks) photometric coverage of over 320 square degrees. Results based on this impressive dataset are presented, showing the global properties of the bulge in order to investigate its place in the general context of galaxy bulges.

The Milky Way bulge has been recently shown to be much more complex than previously thought. It is certainly X-shaped, a structure that is believed to originate from the instability of bars, as the extreme case of a peanut (Debattista et al. 2006). Examples of such complicated structures are observed among bulges of edge-on disk galaxies, however most of our understanding of these bulges is based on models due to the observational impossibility of resolving in detail these internal regions in external galaxies. Thus, our aim is to investigate the large-scale structure, stellar populations and kinematical properties of the bulge, in order to build a *bridge* between the resolved stellar studies of the Milky Way bulge and those of extragalactic bulges, where only studies based on integrated light are possible.

Towards the bulge of our Galaxy, interstellar extinction effects are not only very strong but also highly variable on small scales. To overcome this, we mapped the extinction using the magnitude and colour of the red clump, revealing a large amount of small-scale structure (Gonzalez et al. 2012). A web-based tool named BEAM calculator (mill.astro.puc.cl/BEAM/calculator.php) has been made available to the community from which reddening values of our map can be retrieved. The dereddened VVV stellar photometry was then used to study the complicated bulge morphology from the absolute magnitude of the red clump and to derive photometric metallicities from the color of red giant branch stars (Gonzalez et al. 2013). The end product was the first complete metallicity map of the bulge, shown in Fig. 1, where we observe the Milky Way bulge, for the first time, as it would be seen using an Integral Field Unit (IFU).

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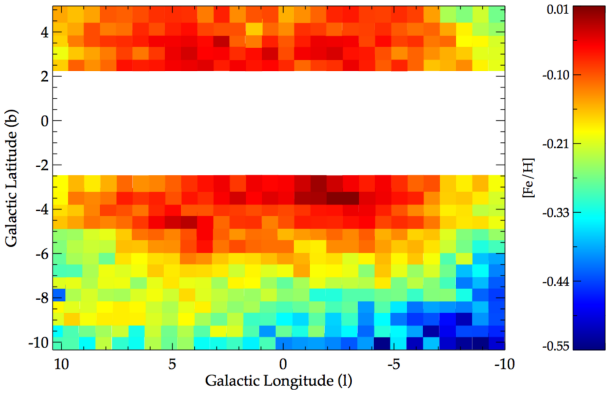

Fig. 1. The complete metallicity map of the Galactic bulge produced using the interpolation of (J-Ks)0 colours of RGB stars between globular cluster ridge lines, with a resolution of 30' x 40'.

In Fig. 1, we observe a radial metallicity gradient of 0.28 dex/kpc and the clear domination of solar metallicity stars in the inner Bulge. The observed metallicity map was recently also reproduced by a boxy-bulge formation model showing that, although other components might still be present, the general properties of the Bulge are fully consistent with a formation scenario where the Bulge is formed from the buckling instabilities of the Galactic bar (Martinez-Valpuesta & Gerhard 2013).

The detailed counterpart of the map shown in Fig. 1, based on a star-by-star study in several fields of the Bulge, will be obtained from the GIRAFFE Inner Bulge Survey (GIBS). This spectroscopic survey, qualitatively similar to the ARGOS survey, but restricted to the inner bulge, has the aim to derive both high-resolution and Calcium II Triplet (CaT) metallicities, radial velocities and, in the near future, proper motions for a sample of ∼5000 bulge stars spread across the area covered by the VVV survey ($-10 < l < +10$, $-10 < b < +5$).

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