RevMexAA (Serie de Conferencias), **40**, 221–224 (2011)

VISTA VARIABLES IN THE VÍA LÁCTEA (VVV): FIRST RESULTS AND PERSPECTIVES

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RESUMEN

VISTA Variables in the Vía Láctea (VVV) es un *survey* público de la ESO para el estudio en el infrarrojo cercano de objectos variables del bulbo de la Vía Láctea y de una sección adyacente del plano del disco. El *survey* empleará 1929 horas de observaciones con el telescopio de 4 m VISTA durante cinco años ($2010-2014$), abarcando $\sim 10^9$ fuentes puntuales en una área de 520 grados^2. A continuación se muestran los primeros resultados obtenidos por el VVV Survey, así como una visión de las posibilidades para el uso de un atlas profundo en cinco bandas en el infrarrojo cercano y un catálogo de más de 10^6 fuentes variables. Esperamos utilizar los datos para encontrar tránsitos planetarios en estrellas de secuencia principal de tipo tardío. Se discuten también la búsqueda de planetas y las futuras observaciones de seguimiento.

ABSTRACT

VISTA Variables in the Vía Láctea (VVV) is a public ESO near-IR variability survey scanning the Milky Way Bulge and an adjacent section of the mid-plane. The survey will take 1929 hours of observations with the 4 m VISTA telescope during five years (2010–2014), covering $\sim 10^9$ point sources across an area of 520 deg^2. Here we address the first results obtained from the VVV Survey as well as a glimpse into the possibilities for using a deep near-IR atlas in five passbands and a catalogue of more than 10^6 variable point sources. We expect to use the data to find planetary transits of late-type main-sequence stars. We discuss the planet searches and future follow-ups.

Key Words: Galaxy: bulge — Galaxy: disk — planets and satellites: general — stars: variables: general — surveys

1. INTRODUCTION

VISTA Variables in the Vía Láctea (VVV) is an ESO Public Survey selected to operate with the new 4-meter Visible and Infrared Survey Telescope for Astronomy (VISTA, Emerson & Sutherland 2010). VVV is scanning the Milky Way Bulge and an adjacent section of the mid-plane, where star formation activity is high. The survey will take 1929 hours of observations during five years (2010–2014), covering $\sim 10^9$ point sources across an area of 520 deg^2. The final product will be a deep near-IR atlas in five passbands (Z, Y, J, H and K_s) and a catalogue of more than 10^6 variable point sources in K_s-band (Minniti et al. 2010a). Detailed information about the VVV Survey can be found at `http://vvvsurvey.org/`.

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2. CURRENT STATUS AND FIRST RESULTS

While some VVV data were obtained on October 2009, during ESO Science Verification of VISTA (Arnaboldi et al. 2010), the regular observations for the first year started in February 2010 and are covering the total survey area in the five passbands. An additional five K_s-band epochs are also being taken for the whole area. About 60% of the observations scheduled for the 1st year are already secured. The data calibration is performed by the VISTA Data Flow System (VDFS) pipeline at the Cambridge Astronomy Survey Unit (CASU)[5], using unsaturated 2MASS stars present in the VVV images, even for Z and Y filters (not observed by 2MASS), for which colour equations are applied.

Among the first results obtained to date for the VVV Survey we can cite the analysis of known open clusters (Peñaloza et al. 2011); the discovery of new open and globular clusters (Minniti et al. 2010b; Borissova et al. 2011); and the study of the Galactic disk edge (Minniti et al. 2011).

[5]VISTA Surveys page at the Cambridge Astronomical Survey Unit (CASU): `http://casu.ast.cam.ac.uk/surveys-projects/vista`.