The COROT Archive at LAEFF


Abstract We describe here the main capabilities of the COROT Archive. The archive\(^1\), managed at LAEFF in the framework of the Spanish Virtual Observatory\(^2\), has been developed following the standards and requirements defined by IVOA\(^3\). The COROT archive at LAEFF will be publicly available by the end of 2008.

1 Introduction

COROT (‘\textit{C}onveccion, \textit{RO}tation and \textit{T}ransits’) is a mission with a twofold objective: the study of the stellar interiors using asteroseismology techniques and the discovery of extrasolar planets using the method of transits. By its high photometric performances and its observing runs covering five months without interruption, COROT is a pioneering project in the discovery of telluric extrasolar planets, bodies with properties comparable to those of the rocky planets of the solar system, and in the study of the internal structure of stellar objects with a precision never achieved before. Successfully launched in December 2006, COROT is performing nominally.

\(^{1}\) http://sdc.laeff.inta.es/corotfa/jsp/searchform.jsp
\(^{2}\) http://svo.laeff.inta.es
\(^{3}\) http://www.ivoa.net
Data delivered to the Principal Investigators and Co-Investigators of the project are already producing important results like the discovery of several Jupiter-sized extrasolar planets or the detection of oscillations and granulations in solar-like stars.

In March 2003 LAEFF was selected as responsible for the development and maintenance of the VO-compliant COROT Archive. The system design was driven by the concept of delivering science-ready data in a simple and efficient way. An overall description of the system capabilities is given in the next section.

2 Functionalities

2.1 Archive Search

The query to the archive is made by means of an HTML fill-in form which permits queries driven by observing run, observational programme (asteroseismology or exoplanets), type of data (light curves or imagettes), object name, COROT identification and coordinates and radius. Searches can be filtered by different criteria like observing date, V magnitude, (B-V) color, effective temperature, spectral type, luminosity class or variability type. Searches are case-independent, and wildcards are permitted. The system also incorporates a built-in name resolver, allowing queries by any of the names provided by the SIMBAD database. The output fields may be ordered by coordinates or COROT identifier and the output format can be retrieved in HTML with a pre-defined number of results shown per page. (Fig. 1).

2.2 Results from Search

An example of the result of a query is given in Fig. 2. Data of interest can be retrieved as FITS, VOTable or ASCII files. In addition to this, the following functionalities are provided:

- Link to SIMBAD: By clicking the object name, a list of alternative names as provided by SIMBAD is displayed.
- Multidownload: Data in FITS format can be retrieved in groups. For multiple retrieval it is possible to include or exclude individual datasets. Multiple download generates a file in zip format.
- FITS Header/Data preview: A browse plot of the light curve as well as a visualization of the associated FITS header is generated by clicking on the corresponding link. The user can select the columns to be plotted. Zoom views can be generated by dragging the mouse on the light curve and click on the Zoom button. (Fig. 3).
• VO Discovery tool: a discovery tool developed by the Spanish Virtual Observatory provides information on the catalogues, images and spectra available from VO services containing information of the object (Fig. 4).

• Supervised classification: At the end of the mission COROT will produce light curves for up to 60000 stars with a sampling rate better than 10 minutes during 5 months. Among this large sample, many new variable stars of known and unknown type will be present. Fast classification is an important step for the further analysis of the objects of interest. The Spanish VO together with the Leuven University is developing a supervised classifier to be used with COROT data ([1] [2]). Information on classification can be accessed from the COROT archive (Fig. 2).

References

Fig. 2  Output of the query

Fig. 3  Light curve and FITS header visualization

Fig. 4  Results obtained using the VO discovery tool implemented in the system
Acknowledgements  This research has made use of the Spanish Virtual Observatory supported from the Spanish MEC through grants AyA2008-02156, AyA2005-04286