

# The CoRoT Bright Star Catalogue

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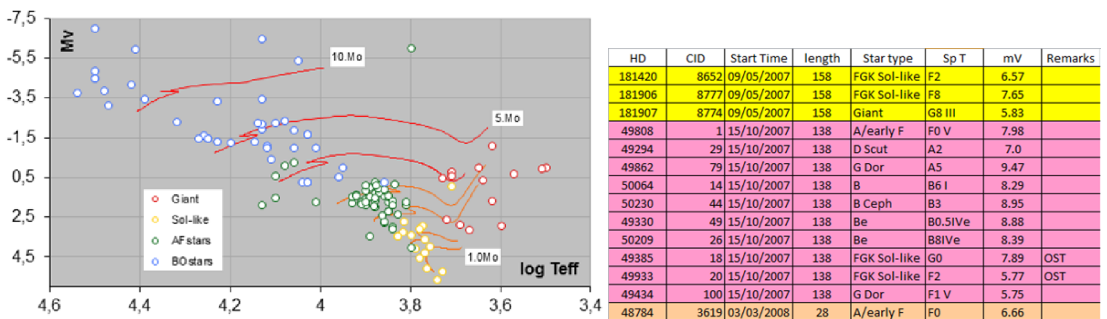
**Abstract.** The CoRoT bright stars catalogue describes the 143 different objects observed during the mission, in the "bright star" field of CoRoT, and their major properties. The almost continuous observations lasted between 20 and 156 days, with a regular 32s sampling time. This catalogue, as well as the corresponding data, are available at CDS (Centre de données astronomiques de Strasbourg) in *Vizier*.

## 1 The CoRoT "Bright Stars"

The CoRoT "bright stars" programme was focussed essentially on astroseismology. It has been optimized for stars with  $5.4 \leq m_V \leq 9.5$  and the instrument was designed to be able to detect solar like oscillations in a reasonable sample of targets. It measures the stellar photon flux in the visible with a high precision, close to the photon noise limit: for a 6th magnitude star the noise level is of  $0.156 \text{ ppm}^2 / \mu\text{Hz}$ . Due to the constraints on the mission, only two regions of the sky allow continuous observations during long periods: the "CoRoT eyes", approximately two disks of 10 degrees radius centered at 0 deg declination, 6h50 and 18h50 hour angles. [1].

The observations from space have been performed between January 2007 and November 2012.

Among the 143 different stars observed with CoRoT, 15 have been observed twice and one has been observed three times. They have spectral types from O to G, and luminosity classes from V to III. Their position in the HR diagram is shown in Fig.1.



**Fig. 1. Right:** HR diagram of the bright stars observed with CoRoT.  $M_V$  and  $T_{\text{eff}}$  after [3]. **Left:** A few lines of the CoRoT Bright Star Catalogue.

The wide range of the targets, as well as the long uninterrupted observations, has allowed to detect a large variety of behaviors some expected, some unexpected. A few examples are mentioned below.

HD 52265, a bright G Main Sequence solar like pulsator with a known planet, shows solar-type pulsations; frequencies and amplitudes have been measured with a very high accuracy [2] as well as

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the inclination of its spin axis [4], putting severe constraints on the mass, radius and age of the host star, and also inferring a more precise mass of the companion confirming that it is a  $1.17 - 1.26 M_{\text{Jup}}$  planet and not a brown dwarf [7].

HD 49330, a Be star which has been caught by chance during an outburst, shows correlation between the pulsation amplitudes and the different outburst phases [5]. The amplitude of the p-modes decrease during the burst and on the energy in very low frequency peaks increases. This is interpreted as due to the stochastic excitation of gravito-inertial modes by the structural perturbation induced in surface layers when matter is ejected and transmitted to the accretion disk [9].

HD181907 is the first red giant showing a complete spectrum of solar like oscillations. The echelle diagram revealed the presence of non-radial pulsations ( $l=1, 2$ ) [6]. These oscillations, quite common in red giants, are now used to probe the galactic structure [10]. In addition a sharp structure in the interior has been detected and attributed to the local depression of the sound speed in the Helium ionisation zone [8].

But, beyond the results already published, many more discoveries are certainly hidden in the data!

## 2 The content of the catalogue

For all stars of this catalogue, CoRoT light curves with 32s regular sampling (in solar system barycentric time scale) are available with various length between 20 and 158 days at CDS, in the *Vizier* environment.

The catalogue contains 159 lines, one per object for each epoch of observation.

For each line the following fields are proposed:

**-1 HD** (HD number when available), **-2 CID** (CoRoT identifier), **-3 Start time** (starting UTC date), **-4 Length** (duration of the observations, in days), **-5 Star type** (see below), **-6 Sp T** (spectral type and luminosity class) [3] **-7 mV** [3], **- 8 Remarks** : EB (eclipsing binary); OST (observed several times) ....

The star types are defined as:

**O** : O type stars, **B** : B type stars, **Be** : B type stars with emission lines, **B Ceph** : Beta Cephei stars\*, **CP** : Chemically peculiar stars\*, **A/early F** : A and early F type stars, **D Scut** : Delta Scuti stars\*, **G Dor** : Gamma Doradus stars\*, **Late F/G** : Late F and G stars, **FGK Sol-like** : F, G, K type stars showing solar-like pulsations\*, **KM** : K or M type stars, **Giant** : Red giants (occasionally yellow), **TBC** : to be confirmed,

where \* means : previously known or discovered with CoRoT data.

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