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The MOST and COROT prime target fields: A target inventory

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Abstract

MOST and COROT are two satellite missions dedicated to asteroseismology and the detection of exoplanets. Both satellites use CCDs as a detector and hence they do not exclusively observe their prime targets but an entire field with additional objects. It is crucial to know their astrophysical properties and to have information on the location in the CCD-fields. Therefore VISAT (VIenna Selection of Astronomical Targets, see Kallinger et al., this volume) was used to investigate the fields around the prime targets of COROT and MOST resulting in the two catalogues described in this article.

Introduction

MOST (Microvariability and Oscillation of STars) is a Canadian microsatellite performing asteroseimology of sun-like and magnetic stars as well as studying microvariability in Wolf-Rayet winds and other targets. It is a low budget mission which demonstrates that even small missions can perform high quality observations. MOST has been launched by Eurockot on June 30th, 2003, from Plesetsk, Russia, with a Proton rocket and operates at an altitude of 820 km in a polar dawn-dusk orbit. The optical system consists of a 15-cm-Maksutov telescope and a CCD camera (1024 by 1024 pixels). An array of 36 Fabry lenses in the focus of the telescope (Fig. 1) minimizes the effect of satellite jitter and provides the required photometric precision (Matthews 1998).

COROT (COnvection, ROtation and planetary Transits) is a French-lead satellite mission with the cooporation of several, mainly European countries which is dedicated to asteroseismology and the discovery and study of exo-planets with the transit technique. Launch date is mid 2006 and COROT will perform its observations from an 800 - 900 km polar orbit. COROT is equipped

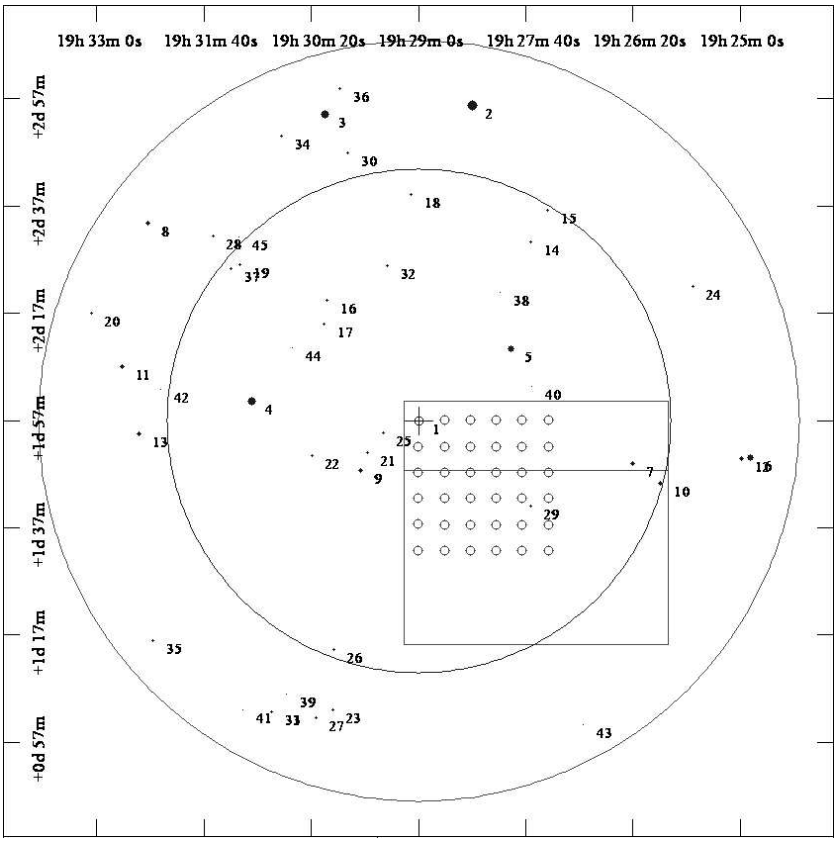

Figure 1: MOST chart of HD 183324 as produced by VISAT. The smaller circle represents the accessible area for the MOST camera for HD 183324. The target star can be positioned in one of the 36 fabry lenses and the CCD can be rotated at an angle of 360 degrees. In inserted rectangular illustrates the CCD and the location of the Fabry lenses.

with a 27 cm telescope and two CCDs (1024 by 1024 pixels) for asteroseismology and exoplanet search each (Baglin et al. 2002). The satellite can be rotated around the optical axis by an angle of $\pm$ 20 degrees (see Fig. 2).

Many interesting objects can be found in the field of view (FOV) of those satellites, as is illustrated in Fig. 3. The orientation of the CCD's projected on the sky defines the observable targets and hence the amount of accessible science. To optimize the scientific output, information about the astrophysical properties is required and also their location in the FOV.

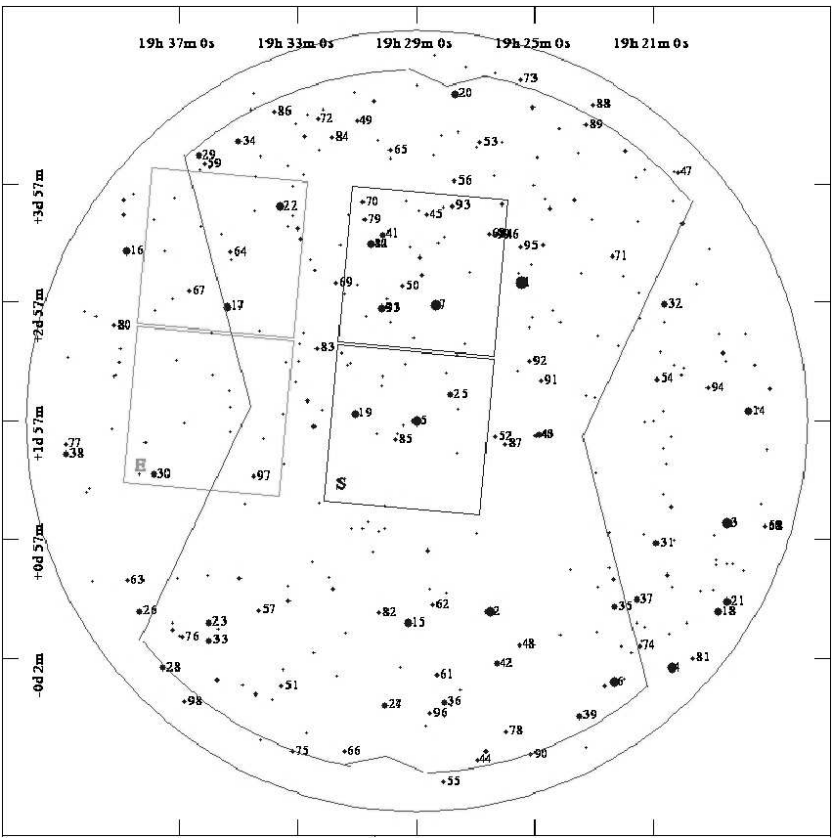

Figure 2: COROT star chart for HD 183324. The two rectangles represent the CCD's for the asteroseismology (left) and the exoplanet program (right). The dumbell-shaped figure represents the accessible area for the COROT seismology CCD's when HD 183324 is anywhere on the seismology field. The field of view can be rotated by an angle of $\pm$ 20 degrees.

The present investigation is an attempt to characterize the area around the prime targets and to provide this information to the scientific community for preparing additional science programs. For this reason we analyzed the fields using the VISAT database, which contains catalogs and information, based also on private communications, specialized in different types and objects, such as δ Scuti stars, rapidly oscillating Ap (roAp) stars, etc. (see T. Kallinger et al., this volume).

MOST targets		COROT targets
HD 61421(Procyon)	HD 38529	HD 171834
HD 121370 (η Boo)	HD 191765 (WR 134)	HD 174866
HD 10700 (τ Cet)	HD 192103 (WR 135)	HD 183324
HD 102870(β Vir)	HD 17723 (WR 123)	HD 184663
HD 142860 (γ Ser)	HD 149757 (ζ Oph)	HD 43318
HD 99028 (ι Leo)	HD 114710 (β Com)	HD 43587
HD 224930	HD 22049 (ϵ Eri)	HD 46304
HD 76932	HD 120136 (τ Boo)	HD 45067
HD 201601 (γ Equ)	HD 209458	HD 46304
HD 176232 (10 Aql)	HD 165688 (WR 110)	HD 49933
HD 24712 (HR 1217)	QR Sge (WR 124)	HD 55057
HD 217014 (51 Peg)	HD 56925 (WR 007)	HD 57006

Table 1: The MOST and COROT prime targets, analyzed in this paper

Target inventory

The catalogs of the MOST and COROT field analyses contain a VISAT star chart and an object list for each prime target, which contains any entry found in the database. A list of the analyzed MOST and COROT prime target stars can be found in Tab. 1.

Fig. 1 and Fig. 2 show the star charts of the MOST and COROT mask produced by VISAT. The circle in Fig. 1 and the dumbell-shaped figure in Fig. 2 represent the accessible area for MOST and COROT, provided that the prime target is anywhere in the photometric area of the CCD. All objects shown in this charts are stars which have entries in the VISAT database.

Fig. 3 shows an example of an object list. As a star can be found in different catalogues, multiple entries are possible. Among star identifier and coordinates, the list contains also information on the spectral type and photometric parameters extracted from SIMBAD. As the catalogs implemented in VISAT provide different spectral classifications, multiple spectral types are possible. If a star was only found in one catalogue, the spectral type entry from SIMBAD was added. Absolute lumniosity (M_V) was either calculated using Hipparcos parallaxes or using the calibration given by Gray (1992).

Furthermore, HR-diagrams of the COROT fields were generated (Fig. 4). Full circles represent the datapoints with M_V, calculated with Hipparcos parallaxes, the light stars were obtained using the calibration given by Gray. A few regions for variable stars, like the instability strip and the regions for β Cephei, SBP and γ Dor stars were added in the HR-diagrams.

The complete MOST catalogues for all the prime targets presently chosen

HD 183324

VISAT-Extraction brighter than 9.5 mag (V)

ID	RA	DE	V	Catalogue Name	Spectral type	B-V	M(V)	(b-y)	m1	c1	Hbeta
HD 182640	19 25 28	+03 06 48	3.35	AP stars	F0 CA wk	0.28	2.47	0.204	0.168	0.715	2.739
HD 182640	19 25 30	+03 06 52	3.36	bright stars	F3 IV	0.28	2.47				
HD 182640	19 25 28	+03 06 48	3.36	COROT targets scenario2	F0 IV	0.28	2.47				
HD 182640	19 25 28	+03 06 48	3.4	Michigan Catalog Vol.5	F2 IV	0.28	2.47				
HD 182835	19 26 30	+00 20 18	4.64	COROT targets scenario2	F2 lab	0.522	-4.60	0.42	0.069	1.449	
HD 182835	19 26 31	+00 20 18	4.66	bright stars	F2 lab	0.522	-4.60				
HD 182835	19 26 30	+00 20 18	4.687	Michigan Catalog Vol.5	F (m;deltaDel)	0.522	-4.60				
HD 183324	19 29 00	+01 57 02	5.79	COROT targets scenario2	A0 V	0.083	1.94	0.051	0.167	1.002	
HD 183324	19 29 00	+01 57 00	5.79	delta Scuti stars		0.083	1.94				
HD 183324	19 29 00	+01 57 02	5.79	lambda Bootis stars		0.083	1.94				
HD 183324	19 29 00	+01 57 02	5.793	Michigan Catalog Vol.5	B9.5 V	0.083	1.94				
HD 183324	19 29 00	+01 57 01	5.8	bright stars	A0 IVp	0.083	1.94				
HD 181907	19 22 21	-00 15 07	5.824	Michigan Catalog Vol.5	K1 III / G8 III (S)	1.09	0.59	0.673	0.442	0.428	
HD 181907	19 22 21	-00 15 09	5.83	bright stars	gG8	1.09	0.59				
HD 183227	19 28 20	+02 55 49	5.84	COROT targets scenario2	B6 III	-0.007	-1.64	0.058	0.049	0.603	
HD 183227	19 28 20	+02 55 49	5.847	Michigan Catalog Vol.5	B3 III	-0.007	-1.64				
HD 183227	19 28 20	+02 55 49	5.85	bright stars	B6 III	-0.007	-1.64				
HD 183656	19 30 33	+03 26 39	6.09	COROT targets scenario2	A0 sh(e)	-0.022	-1.26	0.05	0.037	0.809	
HD 183656	19 30 33	+03 26 39	6.09	Hipparcos unsolved variable	A0 sh	-0.022	-1.26				
HD 183387	19 29 17	+00 14 45	6.25	bright stars	K2	1.315	-0.08				
HD 183387	19 29 17	+00 14 46	6.256	Michigan Catalog Vol.5	K2 III	1.315	-0.08				
HD 184663	19 35 25	+02 54 45	6.37	COROT targets scenario2	F6 IV	0.374	3.26	0.275	0.149	0.476	
HD 184663	19 35 25	+02 54 47	6.38	bright stars	F6 IV	0.374	3.26				
HD 184663	19 35 25	+02 54 45	6.38	Michigan Catalog Vol.5	F5 V	0.374	3.26				
HD 183793	19 31 05	+02 00 43	6.526	Michigan Catalog Vol.5	G8 III CN II / K0 (S)	1.48	-0.91				
HD 181420	19 20 26	-01 18 38	6.57	Michigan Catalog Vol.5	F3 V / F2 (S)	0.395	3.10	0.28	0.157	0.477	
HD 183085	19 27 41	+04 42 34	6.727	Michigan Catalog Vol.5	F2 V	0.331	-0.04	0.244	0.133	0.876	
HD 183085	19 27 41	+04 42 34	6.73	COROT targets scenario2	F0	0.331	-0.04				
HD 184279	19 33 36	+03 45 40	6.98	COROT targets scenario2	B0.5 IV	0	-1.95				
HD 184279	19 33 37	+03 45 40	6.98	Hipparcos unsolved variable	B0.5 IV	0	-1.95				
HD 184279	19 33 36	+03 45 40	6.98	Michigan Catalog Vol.5	B2 Ib/II(e)	0	-1.95	0.117	-0.026	0.148	
HD 184767	19 36 00	+00 14 58	7.16	COROT targets scenario2	A2	0.267	-1.16	0.29	-0.003	1.298	
HD 184767	19 36 00	+00 14 58	7.179	Michigan Catalog Vol.5	A0 III	0.267	-1.16				
HD 183518	19 30 04	-00 26 41	7.2	Michigan Catalog Vol.5	A3 V	0.4	2.08	0.111	0.185	0.97	
HD 183518	19 30 04	+00 26 41	7.34	COROT targets scenario2	A3	0.4	2.08				
HD 183518	19 30 04	-00 26 41	7.34	Hipparcos possibly micro variable	A3	0.4	2.08				
HD 183105	19 27 51	+02 10 27	7.26	Michigan Catalog Vol.5	K3 III / K2 (S)	1.59	0.13				
HD 183265	19 28 40	+03 41 38	7.33	COROT targets scenario2	A0	-0.6	1.43				
HD 181555	19 20 56	+00 54 54	7.52	Michigan Catalog Vol.5	A9 III / A5	0.28	2.42	0.189	0.18	0.891	
HD 184768	19 36 00	+00 05 47	7.55	COROT targets scenario2	G5	0.68	4.61	0.426	0.214	0.343	

Figure 3: Object list of the field stars around HD 183324. As one star can be found in different catalogues implemented in VISAT, multiple entries are possible. If there was only one spectral type entry found, a SIMBAD entry was added which was marked with (S). The photometric parameters were extracted from SIMBAD, M_V was calculated using Hipparcos data (SIMBAD) or the calibration from Gray, F. D.

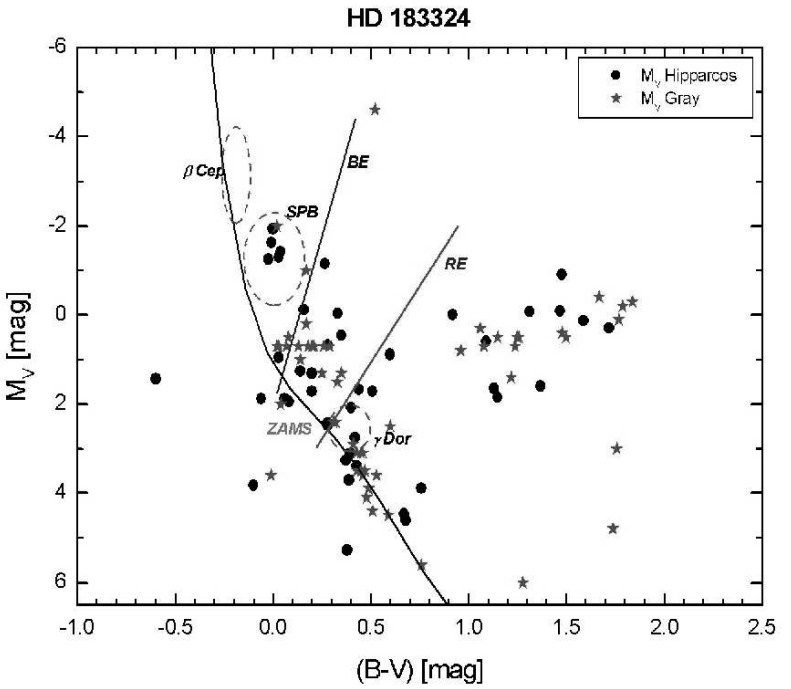

Figure 4: HR-diagram of the field around HD 183324. Full circles represent data calculated using Hipparcos data (extracted from SIMBAD). Lighter stars represent data which were calculated using the calibration given by Gray, F. D. The blue and red edge of the instability strip as well as some further regions where variable stars can be found are added.

for the first two years of operation can be downloaded from
http://ams.astro.univie.ac.at/space/mostinventory.pdf
and for COROT from
http://ams.astro.univie.ac.at/space/corotinventory.pdf (COROT).

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References

Matthews, J. 1998, Cassiopeia, CASC newsletter, No. 96

Baglin, A., Auvergne, M., Barge, P., Buey, J.-T., Catala, C., Michel, E., Weiss, W. W.,and the COROT Team 2002, COROT: asteroseismology and planet finding,Proceedings of the First Eddington Workshop, ESA SP-485, p. 17

Gray, F. D. 1992, The observation and analysis of stellar photospheres, Second Edition, (Cambridge, Cambridge University Press), p.430-434

Kallinger, T., Zwintz, K., Kaiser, A., Mittermayer, P., Weiss, W. W., 2003, CoAst, Vol. 143