Determination of stellar parameters for FGK-dwarf stars: the NIR approach

by

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A thesis submitted in conformity with the requirements
for the degree of Doctor of Philosophy
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Dedication

To Linnea, Henriette, Rico, and Else

For always supporting me

Acknowledgements

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Abstract

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Resumo

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Appendix A

SWEET-Cat update of 50 planet hosts

Table A.1: Derived parameters for the 50 stars in our sample. The S/N was measured by ARES.

Star	$T_{\rm eff}$ [K]	$\log g$ [cgs]	[Fe /H]	$\xi_{\rm micro}$ [km/s]	$\xi_{\rm micro}$ fixed?	Instrument	S/N
BD -11 4672	4553 ± 75	4.87 ± 0.51	-0.30 ± 0.02	0.14 ± 0.07	yes	FIES	487
BD +49 828	5015 ± 36	2.87 ± 0.09[a]	-0.01 ± 0.03	1.48 ± 0.04	no	FIES	567
GJ 785	5087 ± 48	4.42 ± 0.10	-0.01 ± 0.03	0.69 ± 0.10	no	HARPS	801
HATS-1	5969 ± 46	4.39 ± 0.06	-0.04 ± 0.04	1.06 ± 0.08	no	UVES	155
HATS-5	5383 ± 91	4.41 ± 0.22	0.08 ± 0.06	0.91 ± 0.14	no	UVES	158
HAT-P-12	4642 ± 106	4.53 ± 0.27	-0.26 ± 0.06	0.28 ± 0.63	no	FIES	185
HAT-P-24	6470 ± 181	4.33 ± 0.27	-0.41 ± 0.10	1.40 ± 0.03	yes	UVES	158
HAT-P-39	6745 ± 236	4.39 ± 0.47	-0.21 ± 0.12	1.53 ± 0.04	yes	UVES	127
HAT-P-42	5903 ± 66	4.29 ± 0.10[a]	0.34 ± 0.05	1.19 ± 0.08	no	UVES	130
HAT-P-46	6421 ± 121	4.53 ± 0.14[a]	0.16 ± 0.09	1.67 ± 0.18	no	UVES	208
HD 120084	4969 ± 40	2.94 ± 0.14[a]	0.12 ± 0.03	1.41 ± 0.04	no	ESPaDOnS	852
HD 192263	4946 ± 46	4.61 ± 0.14	-0.05 ± 0.02	0.66 ± 0.12	no	HARPS	415

Table A.1: continued.

Star	T_{eff} [K]	$\log g$ [cgs]	[Fe /H]	ξ_{micro} [km/s]	ξ_{micro} fixed?	Instrument	S/N
HD 219134	4767 ± 70	4.57 ± 0.17	0.00 ± 0.04	0.59 ± 0.24	no	ESPaDOnS	725
HD 220842	5999 ± 39	4.30 ± 0.06[a]	-0.08 ± 0.03	1.21 ± 0.05	no	FIES	459
HD 233604	4954 ± 46	2.86 ± 0.11[a]	-0.14 ± 0.04	1.61 ± 0.05	no	FIES	314
HD 283668	4841 ± 73	4.51 ± 0.18	-0.74 ± 0.04	0.16 ± 0.61	no	FIES	592
HD 285507	4620 ± 126	4.72 ± 0.61	0.04 ± 0.06	0.74 ± 0.43	no	UVES	239
HD 5583	4986 ± 35	2.87 ± 0.09[a]	-0.35 ± 0.03	1.62 ± 0.04	no	FIES	933
HD 81688	4903 ± 21	2.70 ± 0.05[a]	-0.21 ± 0.02	1.54 ± 0.02	no	[b]	1350, 860
HD 82886	5123 ± 18	3.30 ± 0.04[a]	-0.25 ± 0.01	1.16 ± 0.02	no	[c]	1198,1294
HD 87883	4917 ± 68	4.53 ± 0.19	0.02 ± 0.03	0.46 ± 0.21	no	ESPaDOnS	753
HIP 107773	4957 ± 49	2.83 ± 0.09[a]	0.04 ± 0.04	1.49 ± 0.05	no	UVES	218
HIP 11915	5770 ± 14	4.33 ± 0.03	-0.06 ± 0.01	0.95 ± 0.02	no	HARPS	709
HIP 116454	5042 ± 72	4.69 ± 0.15	-0.16 ± 0.03	0.71 ± 0.17	no	UVES	412
HR 228	5042 ± 42	3.30 ± 0.09[a]	0.07 ± 0.03	1.14 ± 0.04	no	UVES	400
KELT-6	6246 ± 88	4.22 ± 0.09[a]	-0.22 ± 0.06	1.66 ± 0.13	no	FIES	374
Kepler-37	5378 ± 53	4.47 ± 0.12	-0.23 ± 0.04	0.58 ± 0.13	no	FIES	205
Kepler-444	5111 ± 43	4.50 ± 0.13	-0.51 ± 0.03	0.37 ± 0.15	no	FIES	675
mu Leo	4605 ± 94	2.61 ± 0.26[a]	0.25 ± 0.06	1.64 ± 0.11	no	ESPaDOnS	354
ome Ser	4928 ± 35	2.69 ± 0.06[a]	-0.11 ± 0.03	1.55 ± 0.04	no	FIES	1168
omi UMa	5499 ± 52	3.36 ± 0.07[a]	-0.01 ± 0.05	1.98 ± 0.06	no	ESPaDOnS	527
Qatar-2	4637 ± 316	4.53 ± 0.62	0.09 ± 0.17	0.63 ± 0.83	no	UVES	97
SAND364	4457 ± 104	2.26 ± 0.20[a]	-0.04 ± 0.06	1.60 ± 0.11	no	UVES	220
TYC+1422-614-1	4908 ± 41	2.90 ± 0.12[a]	-0.07 ± 0.03	1.57 ± 0.05	no	FIES	506
WASP-37	5917 ± 72	4.25 ± 0.15	-0.23 ± 0.05	0.59 ± 0.13	no	FIES	232
WASP-44	5612 ± 80	4.39 ± 0.30	0.17 ± 0.06	1.32 ± 0.13	no	UVES	125
WASP-52	5197 ± 83	4.55 ± 0.30	0.15 ± 0.05	1.16 ± 0.14	no	UVES	125
WASP-58	6039 ± 55	4.23 ± 0.10	-0.09 ± 0.04	1.12 ± 0.08	no	FIES	310

Table A.1: continued.

Star	T_{eff} [K]	$\log g$ [cgs]	[Fe /H]	ξ_{micro} [km/s]	ξ_{micro} fixed?	Instrument	S/N
WASP-61	6265 ± 168	4.21 ± 0.21[a]	-0.38 ± 0.11	1.44 ± 0.02	yes	UVES	163
WASP-72	6570 ± 85	4.25 ± 0.13	0.15 ± 0.06	2.30 ± 0.15	no	UVES	174
WASP-73	6203 ± 32	4.16 ± 0.06[a]	0.20 ± 0.02	1.66 ± 0.04	np	[d]	193,231
WASP-75	6203 ± 46	4.42 ± 0.22[a]	0.24 ± 0.03	1.45 ± 0.06	no	UVES	189
WASP-76	6347 ± 52	4.29 ± 0.08[a]	0.36 ± 0.04	1.73 ± 0.06	no	UVES	165
WASP-82	6563 ± 55	4.29 ± 0.10[a]	0.18 ± 0.04	1.93 ± 0.08	no	UVES	239
WASP-88	6450 ± 61	4.24 ± 0.06[a]	0.03 ± 0.04	1.79 ± 0.09	no	UVES	174
WASP-94 A	6259 ± 34	4.34 ± 0.07[a]	0.35 ± 0.03	1.50 ± 0.04	no	UVES	356
WASP-94 B	6137 ± 21	4.42 ± 0.05[a]	0.33 ± 0.02	1.29 ± 0.03	no	UVES	397
WASP-95	5799 ± 31	4.29 ± 0.05[a]	0.22 ± 0.03	1.18 ± 0.04	no	UVES	247
WASP-97	5723 ± 52	4.24 ± 0.07	0.31 ± 0.04	1.03 ± 0.08	no	UVES	219
WASP-99	6324 ± 89	4.34 ± 0.12	0.27 ± 0.06	1.83 ± 0.12	no	UVES	249
WASP-100	6853 ± 209	4.15 ± 0.26[a]	-0.30 ± 0.12	1.87 ± 0.02	yes	UVES	166

[a] Spectroscopic $\log g$.

[b] Weighted average of ESPaDoNS and FIES results. The parameters are (FIES in parantheses): $T_{\mathrm{eff}} = 4870(4934) \pm 30(29)$, $\log g = 2.50(2.73) \pm 0.14(0.05)$, $[\mathrm{Fe/H}] = -0.26(-0.19) \pm 0.03(0.02)$, and $\xi_{\mathrm{micro}} = 1.50(1.59) \pm 0.03(0.03)$.

[c] Weighted average of ESPaDoNS and FIES results. The parameters are (FIES in parantheses): $T_{\mathrm{eff}} = 5124(5121) \pm 22(29)$, $\log g = 3.30(3.31) \pm 0.05(0.07)$, $[\mathrm{Fe/H}] = -0.25(-0.24) \pm 0.02(0.02)$, and $\xi_{\mathrm{micro}} = 1.15(1.17) \pm 0.03(0.04)$.

[d] Weighted average of UVES and FEROS results. The parameters are (FEROS in parantheses): $T_{\mathrm{eff}} = 6313(6162) \pm 61(37)$, $\log g = 4.26(4.14) \pm 0.15(0.06)$, $[\mathrm{Fe/H}] = 0.22(0.19) \pm 0.04(0.03)$, and $\xi_{\mathrm{micro}} = 1.85(1.61) \pm 0.08(0.04)$.

Table A.2: Previous parameters from SWEET-Cat.

Star	T_{eff} [K]	$\log g$ [cgs]	[Fe /H]	ξ_{micro} [km/s]	Reference
BD-114672	4475 ± 100	4.10 ± 0.36	-0.48 ± 0.05	0.67 ± 0.16	Moutou et al. (2015)
BD +49 828	4943 ± 30	2.85 ± 0.09	-0.19 ± 0.06	...	Niedzielski et al. (2015b)
GJ 785	5144 ± 50	4.60 ± 0.06	0.08 ± 0.03	...	Howard et al. (2011)
HATS-1	5780 ± 100	4.40 ± 0.08	-0.06 ± 0.12	...	Penev et al. (2013)
HATS-5	5304 ± 50	4.53 ± 0.02	0.19 ± 0.08	...	Zhou et al. (2014)
HAT-P-12	4650 ± 60	4.61 ± 0.02	-0.29 ± 0.05	...	Lee et al. (2014)
HAT-P-24	6373 ± 80	4.29 ± 0.04	-0.16 ± 0.08	...	Kipping et al. (2010)
HAT-P-39	6340 ± 100	4.16 ± 0.03	0.19 ± 0.10	...	Hartman et al. (2012)
HAT-P-46	6120 ± 100	4.25 ± 0.11	0.30 ± 0.10	$0.85 \pm$ ...	Hartman et al. (2014b)
HAT-P-42	5743 ± 50	4.14 ± 0.07	0.27 ± 0.08	...	Boisse et al. (2013)
HD 120084	4892 ± 22	2.71 ± 0.08	0.09 ± 0.05	1.31 ± 0.10	Sato et al. (2013a)
HD 192263	4906 ± 57	4.36 ± 0.17	-0.07 ± 0.02	0.78 ± 0.12	Tsantaki et al. (2013)
HD 219134	4699 ± 16	4.63 ± 0.10	0.11 ± 0.04	0.35 ± 0.19	Motalebi et al. (2015)
HD 220074	3935 ± 110	1.30 ± 0.50	-0.25 ± 0.25	1.60 ± 0.30	Lee et al. (2013)
HD 220842	5920 ± 20	4.24 ± 0.02	-0.17 ± 0.02	...	Hébrard et al. (2016)
HD 233604	4791 ± 45	2.55 ± 0.18	-0.36 ± 0.04	...	Nowak et al. (2013)
HD 283668	4845 ± 66	4.35 ± 0.12	-0.75 ± 0.12	0.02 ± 0.30	Wilson et al. (2016)
HD 285507	4503 ± 73	4.67 ± 0.06	0.13 ± 0.01	...	Quinn et al. (2014)
HD 5583	4830 ± 45	2.53 ± 0.14	-0.50 ± 0.18	...	Niedzielski et al. (2016)
HD 81688	4753 ± 15	2.22 ± 0.05	-0.36 ± 0.02	1.43 ± 0.05	Sato et al. (2008)
HD 82886	5112 ± 44	3.40 ± 0.06	-0.31 ± 0.03	...	Johnson et al. (2011)
HD 87883	4958 ± 44	4.56 ± 0.06	0.07 ± 0.03	...	Valenti and Fischer (2005)
HIP 107773	4945 ± 100	2.60 ± 0.20	0.03 ± 0.10	...	Jones et al. (2015)
HIP 11915	5760 ± 4	4.46 ± 0.01	-0.06 ± 0.00	...	Bedell et al. (2015)
HIP 116454	5089 ± 50	4.59 ± 0.03	-0.16 ± 0.08	...	Vanderburg et al. (2015)
HR 228	4959 ± 25	3.16 ± 0.08	0.01 ± 0.04	1.12 ± 0.07	Sato et al. (2013b)

Table A.2: continued.

Star	T_{eff} [K]	$\log g$ [cgs]	[Fe /H]	ξ_{micro} [km/s]	Reference
KELT-6	6102 ± 43	4.07 ± 0.06	-0.28 ± 0.04	...	Collins et al. (2014)
Kepler-37	5417 ± 70	4.57 ± 0.01	-0.32 ± 0.07	...	Barclay et al. (2013)
Kepler-444	5046 ± 74	4.60 ± 0.06	-0.55 ± 0.07	...	Campante et al. (2015)
mu Leo	4538 ± 27	2.40 ± 0.10	0.36 ± 0.05	1.40 ± 0.10	Lee et al. (2014)
ome Ser	4770 ± 10	2.32 ± 0.04	-0.24 ± 0.02	1.34 ± 0.04	Sato et al. (2013a)
omi UMa	5242 ± 10	2.64 ± 0.03	-0.09 ± 0.02	1.51 ± 0.07	Sato et al. (2012)
Qatar-2	4645 ± 50	4.60 ± 0.02	-0.02 ± 0.08	...	Bryan et al. (2012)
SAND364	4284 ± 9	2.20 ± 0.06	-0.02 ± 0.04	...	Brucalassi et al. (2014)
TYC+1422-614-1	4806 ± 45	2.85 ± 0.18	-0.20 ± 0.08	...	Niedzielski et al. (2015a)
WASP-37	5940 ± 55	4.39 ± 0.02	-0.40 ± 0.12	...	Simpson et al. (2011)
WASP-44	5400 ± 150	4.48 ± 0.07	0.06 ± 0.10	...	Anderson et al. (2012)
WASP-52	5000 ± 100	4.58 ± 0.01	0.03 ± 0.12	...	Hébrard et al. (2013)
WASP-58	5800 ± 150	4.27 ± 0.09	-0.45 ± 0.09	...	Hébrard et al. (2013)
WASP-61	6250 ± 150	4.26 ± 0.01	-0.10 ± 0.12	...	Hellier et al. (2012)
WASP-72	6250 ± 100	4.08 ± 0.13	-0.06 ± 0.09	1.60 ± 0.10	Gillon et al. (2013)
WASP-73	6030 ± 120	3.92 ± 0.08	0.14 ± 0.14	1.10 ± 0.20	Delrez et al. (2014)
WASP-75	6100 ± 100	4.50 ± 0.10	0.07 ± 0.09	1.30 ± 0.10	Gómez Maqueo Chew et al. (2013)
WASP-76	6250 ± 100	4.13 ± 0.02	0.23 ± 0.10	1.40 ± 0.10	West et al. (2016)
WASP-82	6490 ± 100	3.97 ± 0.02	0.12 ± 0.11	1.50 ± 0.10	West et al. (2016)
WASP-88	6430 ± 130	4.03 ± 0.09	-0.08 ± 0.12	1.40 ± 0.10	Delrez et al. (2014)
WASP-94 A	6170 ± 80	4.27 ± 0.07	0.26 ± 0.15	...	Neveu-VanMalle et al. (2014)
WASP-94 B	6040 ± 90	4.26 ± 0.06	0.23 ± 0.14	...	Neveu-VanMalle et al. (2014)
WASP-95	5630 ± 130	4.38 ± 0.03	0.14 ± 0.16	...	Hellier et al. (2014)
WASP-97	5640 ± 100	4.43 ± 0.03	0.23 ± 0.11	...	Hellier et al. (2014)
WASP-99	6180 ± 100	4.12 ± 0.03	0.21 ± 0.15	...	Hellier et al. (2014)
WASP-100	6900 ± 120	4.04 ± 0.11	-0.03 ± 0.10	...	Hellier et al. (2014)

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