J/A+A/585/A135 HD175607 RV, logRHK and Halpha index (Mortier+, 2016)

The HARPS search for southern extra-solar planets.
XXXIX. HD175607 b, the most metal-poor G dwarf with an orbiting sub-Neptune.
Mortier A., Faria J.P., Santos N.C., Rajpaul V., Figueira P., Boisse I.,
Collier Cameron A., Dumusque X., Lo Curto G., Lovis C., Mayor M., Melo C.,
Pepe F., Queloz D., Santerne A., Segransan D., Sousa S.G., Sozzetti A.,
Udry S.
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=2016A&A...585A.135M (SIMBAD/NED BibCode)

ADC_Keywords: Stars, double and multiple ; Planets ; Radial velocities

Keywords: planetary systems - stars: individual: HD 175607 -
techniques: radial velocities - stars: solar-type - stars: activity -
stars: abundances

Abstract:
The presence of a small-mass planet (M_p<0.1$M_{\{Jup\}}$) seems, to date, not to depend on metallicity. However, theoretical simulations have shown that stars with subsolar metallicities may be favoured for harbouring smaller planets. A large dedicated survey of metal-poor stars with the HARPS spectrograph has thus been carried out to search for Neptunes and super-Earths.

In this paper we present the analysis of HD175607, an old G6 star with metallicity [Fe/H]=-0.62. We gathered 119 radial velocity measurements in 110 nights over a timespan of more than 9 years.

The radial velocities were analysed using Lomb-Scargle periodograms, a genetic algorithm, a Markov-Chain Monte-Carlo analysis, and a Gaussian processes analysis. The spectra were also used to derive stellar properties. Several activity indicators were analysed to study the effect of stellar activity on the radial velocities.

We find evidence for the presence of a small Neptune-mass planet ($M_p$sini=8.98±1.10$M_\odot$) orbiting this star with an orbital period P=29.01±0.02days in a slightly eccentric orbit (e=0.11±0.08). The period of this Neptune is close to the estimated rotational period of the star. However, from a detailed analysis of the radial velocities together with the stellar activity, we conclude that the best explanation of the signal is indeed due to the presence of a planetary companion rather than stellar related. An additional longer period signal (P~1400d) is present in the data, for which more measurements are needed to constrain its nature and its properties.

HD175607 is the most metal-poor FGK dwarf with a detected low mass planet amongst the currently known planet hosts. This discovery may thus have important consequences for planet formation and evolution theories.

Description:
Table hd175607 contains the radial velocities and used stellar activity indices of HD175607.

Objects:

RA (2000)	DE	Designation(s)
19 01 05.49	-66 11 33.7	HD175607 = HIP 93373

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
hd175607.dat	94	110	Radial velocities and activity of HD175607

See also:
J/A+A/469/L43 : Radial velocities of Gl 581 (Udry+, 2007)
J/A+A/474/293 : Radial velocities of GJ 674 (Bonfils+, 2007)
J/A+A/493/639 : Velocity curves of HD 40307 (Mayor+, 2009)
J/A+A/493/645 : Gl 176 radial velocities (Forveille+, 2009)
J/A+A/496/513 : RV of 6 stars with long-period giant planets (Moutou+, 2009)
J/A+A/496/521 : Radial velocities of HD45364 (Correia+, 2009)
J/A+A/496/527 : Radial velocity curves of HD 47186 & HD 181433 (Bouchy+, 2009)
J/A+A/507/487 : GJ 581 radial velocity curve (Mayor+, 2009)
J/A+A/511/A21 : Radial velocities of GJ876 planetary system (Correia+, 2010)
J/A+A/512/A46 : Radial velocities of BD-08 2823 (Hebrard+, 2010)
J/A+A/512/A47 : Radial velocities of 3 stars with giant planets (Santos+ 2010)
J/A+A/512/A48 : HD125612, HD215497, HIP5158 HARPS RV curves (Lo Curto+, 2010)
J/A+A/523/A15 : HARPS XXIII: RV data for the 8 targets (Naef+, 2010)
J/A+A/526/A111 : Radial velocity of HD 85390, 90156, 103197 (Mordasini+, 2011)
J/A+A/526/A112 : Radial velocities of HARPS metal-poor sample (Santos+, 2011)
J/A+A/526/A141 : Velocity monitoring of Gl 676A and HIP 12961 (Forveille+ 2011)
J/A+A/527/A63 : 7 new HARPS planetary systems RV (Moutou+, 2011)
J/A+A/528/A112 : Radial velocities of HD 10180 (Lovis+, 2011)
J/A+A/551/A59 : HD103774, HD109271 and BD-061339 RV curves (Lo Curto+, 2013)

J/A+A/556/A110 : HARPS radial velocities of GJ 163 (Bonfils+, 2013)
J/A+A/566/A35 : Radial velocities of HD 41248 (Santos+, 2014)
J/A+A/575/A119 : 3 HARPS M dwarfs RV and stellar activity
(Astudillo-Defru+, 2015)
J/A+A/576/A48 : Radial velocity monitoring for 6 stars (Moutou+, 2015)
J/A+A/585/A134 : HD1461, HD40307, and HD204313 radial velocities (Diaz+, 2016)

Byte-by-byte Description of file: hd175607.dat

Bytes	Format	Units	Label	Explanations
1- 12	F12.6	d	BJD	Barycentric Julian date (BJD-2400000)
13- 23	F11.5	km/s	RV	Radial velocity
24- 32	F9.5	km/s	e_RV	Error radial velocity
33- 41	F9.5	km/s	FWHM	Full width at half maximum of CCF
42- 51	F10.5	km/s	BIS	Bisector inverse slope of CCF
52- 59	F8.3	%	Contrast	Contrast of CCF
60- 68	F9.4	---	logRHK	Activity index from CaII H&K lines
69- 76	F8.4	---	e_logRHK	Error on logrhk
77- 85	F9.5	---	Ha	Halpha index
86- 94	F9.5	---	e_Ha	Error on Halpha index

Acknowledgements:
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Bonfils et al.,	Paper X	2007A&A...474..293B	Cat. J/A+A/474/293
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Diaz et al.,	Paper XXXVIII	2016A&A...585A.134D	Cat. J/A+A/585/A134

(End) A. Mortier [St Andrews University, UK], P. Vannier [CDS] 26-Nov-2015

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