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Authors	Haywood, R. D., Vanderburg, A., Mortier, A., Giles, H. A. C., Lopez-Morales, M., Lopez, E. D., Malavolta, L., Charbonneau, D., Collier, Cameron A., Coughlin, J. L., Dressing, C. D., Nava, C., Latham, D. W., Dumusque, X., Lovis, C., MOLINARI, Emilio Carlo, Pepe, F., SOZZETTI, Alessandro, Udry, S., Bouchy, F., Johnson, J. A., Mayor, M., MICELA, Giuseppina, Phillips, D., Piotto, G., Rice, K., Sasselov, D., Segransan, D., Watson, C., AFFER, Laura, Bonomo, A. S., Buchhave, L. A., Ciardi, D. R., Fiorenzano, A. F., Harutyunyan, A.
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J/AJ/155/203 HARPS-N RVs & activity indicators for Kepler-1655 (Haywood+, 2018)

An accurate mass determination for Kepler-1655b, a moderately irradiated world with a significant volatile envelope.

Haywood R.D., Vanderburg A., Mortier A., Giles H.A.C., Lopez-Morales M., Lopez E.D., Malavolta L., Charbonneau D., Collier Cameron A., Coughlin J.L., Dressing C.D., Nava C., Latham D.W., Dumusque X., Lovis C., Molinari E., Pepe F., Sozzetti A., Udry S., Bouchy F., Johnson J.A., Mayor M., Micela G., Phillips D., Piotto G., Rice K., Sasselov D., Segransan D., Watson C., Affer L., Bonomo A.S., Buchhave L.A., Ciardi D.R., Fiorenzano A.F., Harutyunyan A.

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=[2018AJ....155..203H](#) (SIMBAD/NED BibCode)

ADC_Keywords: Stars, variable ; Radial velocities ; Spectroscopy ; Exoplanets

Keywords: stars: individual: Kepler-1655, KOI-280, KIC 4141376,
2MASS J19064546+3912428 - planets and satellites: detection -
planets and satellites: gaseous planets

Abstract:

We present the confirmation of a small, moderately irradiated ($F=155\pm 7 F_{\oplus}$) Neptune with a substantial gas envelope in a $P=11.8728787\pm 0.0000085$ day orbit about a quiet, Sun-like G0V star Kepler-1655. Based on our analysis of the Kepler light curve, we determined Kepler-1655b's radius to be $2.213\pm 0.082 R_{\oplus}$. We acquired 95 high-resolution spectra with Telescopio Nazionale Galileo/HARPS-N, enabling us to characterize the host star and determine an accurate mass for Kepler-1655b of $5.0_{-2.8}^{+3.1} M_{\oplus}$ via Gaussian-process regression. Our mass determination excludes an Earth-like composition with 98% confidence. Kepler-1655b falls on the upper edge of the evaporation valley, in the relatively sparsely occupied transition region between rocky and gas-rich planets. It is therefore part of a population of planets that we should actively seek to characterize further.

Description:

We observed Kepler-1655 with the HARPS-N instrument (Cosentino et al. 2012SPIE.8446E..1VC) on the Telescopio Nazionale Galileo (TNG) at La Palma, Spain, over two seasons between 2015 June 7 and 2016 November 13. The spectra were processed using the HARPS Data Reduction System (DRS; Baranne et al. [1996A&AS..119..373B](#)). The cross-correlation was performed using a G2 spectral mask (Pepe et al. [2002Msngr.110....9P](#)). The RV measurements and the spectroscopic activity indicators are provided in Table 4. The median, minimum, and maximum signal to noise ratio of the HARPS spectra at the center of the spectral order number 50 are 51.8, 24.8, and 79.2, respectively.

Objects:

RA	(ICRS)	DE	Designation(s)	(Period)
19 06 45.46		+39 12 43.0	Kepler-1655 = KOI-280	(P=11.8728787)

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table4.dat	70	95	HARPS-N RV observations and spectroscopic activity indicators, determined from the DRS

See also:

[J/A+A/552/A78](#) : Solar like stars radial velocities (Zechmeister+, 2013)

[J/A+A/615/A175](#) : Solar system analogs with HARPS (Barbato+, 2018)

Byte-by-byte Description of file: [table4.dat](#)

Bytes	Format	Units	Label	Explanations
1- 14	F14.6	d	BJD	Barycentric Julian Date (UTC)
16- 24	F9.5	km/s	RV	[-40.64913/-40.62378] Radial velocity
26- 32	F7.5	km/s	e_RV	[0.00217/0.00819] 1 σ uncertainty in RV
34- 40	F7.5	km/s	FWHM	[7.8364/7.89902] Full width at half maximum
42- 47	F6.3	---	Cont	[29.016/29.389] Contrast of the cross-correlation function (1)
49- 55	F7.5	km/s	BIS	[0.00964/0.04897] Line bisector of the cross-correlation function (1)
57- 63	F7.4	[-]	logRHK	[-5.0566/-4.8835] Ca II activity indicator logR' _{HK}
65- 70	F6.4	[-]	e_logRHK	[0.0106/0.0775] 1 σ uncertainty in logR(HK)

Note (1): As defined in Queloz et al. [2001Msngr.105....1Q](#).

History:

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(End)

Tiphaine Pouvreau [CDS]

30-Nov-2018

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