Preprint typeset using LaTeX style emulateapj v. 5/2/11

THE EFFECTS OF TELLURIC LINES IN RADIAL VELOCITY SEARCHES FOR PLANETS WITH IODINE CELL AS CALIBRATORS[1]

Sharon Xuesong Wang (王雪凇)[2,3], Jason T. Wright[2,3], Chad Bender[2,3], Andrew W. Howard[4], Geoffrey W. Marcy[5], Howard Isaacson[5], and Suvrath Mahadevan[2,3]

ABSTRACT

Tellurics are bad and you really don't want them. Here's how to get rid of them.

Subject headings: instrumentation

TABLE 1
STELLAR PARAMETERS

Parameter	Value
Spectral type[a]	K0 V
Distance (pc)[a]	44.0 ± 2.1
V	8.661 ± 0.013
$T_{\rm eff}$ (K)	5448 ±44
$\log g$	4.511 ± 0.024
[Fe/H]	0.336 ± 0.030
BC	-0.144
$M_{\rm bol}$	5.301
$L_\star$ ($L_\odot$)	0.590 ± 0.058
$R_\star$ ($R_\odot$)	0.901 ± 0.015
$M_\star$ ($M_\odot$)	1.000 ± 0.017
$v \sin i$	< 1 km s^{-1}
Age[b]	~ 7 Gyr

[a] ESA (1997); van Leeuwen (2008).
[b] Isaacson & Fischer (2010), see section.

1. INTRODUCTION

I'll keep the first paragraph so there are some references – also because it's cool. Jupiter analogs orbiting other stars represent the first signposts of true Solar System analogs, and the eccentricity distribution of these planets with $a > 3$ AU will reveal how rare or frequent true Jupiter analogs are. To date, only 9 "Jupiter analogs" have been well-characterized in the peer reviewed literature[6] (defined here as $P > 8$ years, $4 > M \sin i > 0.5\ M_{\rm Jup}$, and $e < 0.3$; Wright et al. 2011, exoplanets.org). As the duration of existing planet searches approach 10–20 years, more and more Jupiter analogs will emerge from their longest-observed targets (Wittenmyer et al. 2012; Boisse et al. 2012).

The authors thank John A. Johnson for providing a copy of his Doppler code and his help with our incorporation of the code into the HET pipeline. The authors also thank Debra Fischer for her assistance in this regard.

This work was partially supported by funding from the Center for Exoplanets and Habitable Worlds, which is supported by the Pennsylvania State University, the Eberly College of Science, and the Pennsylvania Space Grant Consortium.

The authors appreciate the significant Keck observing time and associated funding support from NASA for the study of long period planets and mulitplanet systems. J.T.W. and S.X.W. acknowledge support from NASA Origins of Solar Systems grant NNX10AI52G.

The work herein is based on observations obtained at the W. M. Keck Observatory, which is operated jointly by the University of California and the California Institute of Technology. The Keck Observatory was made possible by the generous financial support of the W.M. Keck Foundation. We wish to recognize and acknowledge the very significant cultural role and reverence that the summit of Mauna Kea has always had within the indigenous Hawaiian community. We are most fortunate to have the opportunity to conduct observations from this mountain.

The Hobby-Eberly Telescope is a joint project of the University of Texas at Austin, the Pennsylvania State University, Stanford University, Ludwig Maximillians Universität München, and Georg August Universität Göttingen. The HET is named in honor of its principal benefactors, William P. Hobby and Robert E. Eberly.

This work has made use NASA' s Astrophysics Data System Bibliographic Services.

REFERENCES

Bailey, J., Butler, R. P., Tinney, C. G., et al. 2009, ApJ, 690, 743
Boisse, I., Pepe, F., Perrier, C., et al. 2012, A&A, 545, A55
ESA. 1997, VizieR Online Data Catalog, 1239, 0
Howard, A. W., Johnson, J. A., Marcy, G. W., et al. 2010, ApJ, 721, 1467
Isaacson, H., & Fischer, D. 2010, ApJ, 725, 875
Jones, H. R. A., Butler, R. P., Tinney, C. G., et al. 2010, MNRAS, 403, 1703

[1] Based on observations observations obtained at the Keck Observatory, which is operated by the University of California. The Keck Observatory was made possible by the generous financial support of the W. M. Keck Foundation.

[2] Department of Astronomy and Astrophysics, 525 Davey Laboratory, The Pennsylvania State University, University Park, PA 16802, USA; Send correspondence to xxw131@psu.edu and jtwright@astro.psu.edu
[3] Center for Exoplanets and Habitable Worlds, 525 Davey Laboratory, The Pennsylvania State University, University Park, PA 16802, USA
[4] Hawaii, USA
[5] Department of Astronomy, University of California, Berkeley, CA 94720, USA

[6] HD 13931*b* (Howard et al. 2010), HD 72659*b* (Moutou et al. 2011), 55 Cnc *d* (Marcy et al. 2002), HD 134987*c* (Jones et al. 2010), HD 154345*b* (Wright et al. 2008, but with possibility of being an activity cycle-induced signal), μ Ara *c* (Pepe et al. 2007), HD 183263*c* (Wright et al. 2009), HD 187123*c* (Wright et al. 2009), and GJ 832*b* (Bailey et al. 2009).

Marcy, G. W., Butler, R. P., Fischer, D. A., et al. 2002, ApJ, 581, 1375
Moutou, C., Mayor, M., Lo Curto, G., et al. 2011, A&A, 527, A63
Pepe, F., Correia, A. C. M., Mayor, M., et al. 2007, A&A, 462, 769
van Leeuwen, F. 2008, VizieR Online Data Catalog, 1311, 0
Wittenmyer, R. A., Horner, J., Tuomi, M., et al. 2012, ApJ, 753, 169
Wright, J. T., Marcy, G. W., Butler, R. P., et al. 2008, ApJ, 683, L63
Wright, J. T., Upadhyay, S., Marcy, G. W., et al. 2009, ApJ, 693, 1084
Wright, J. T., Fakhouri, O., Marcy, G. W., et al. 2011, PASP, 123, 412