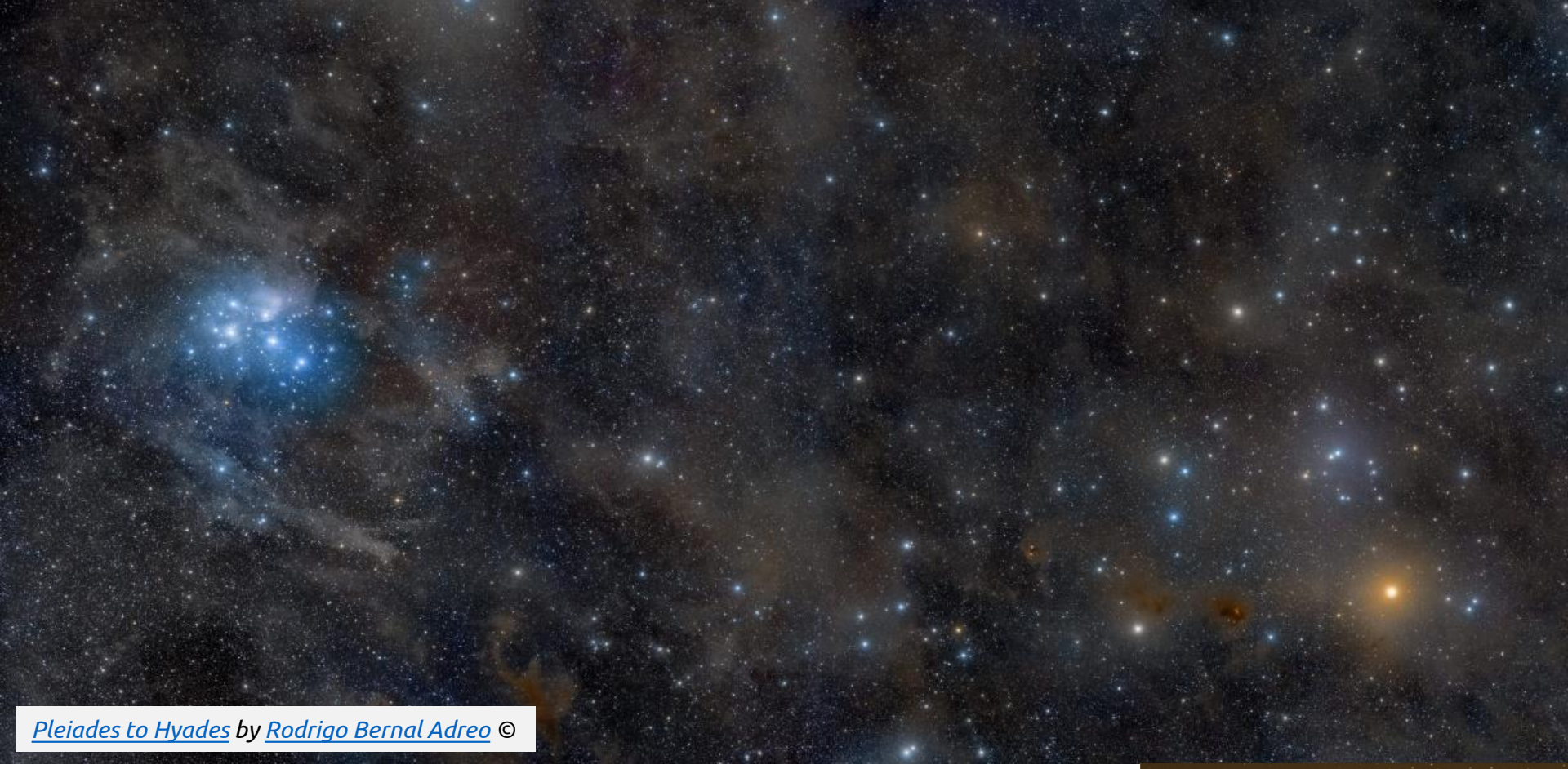
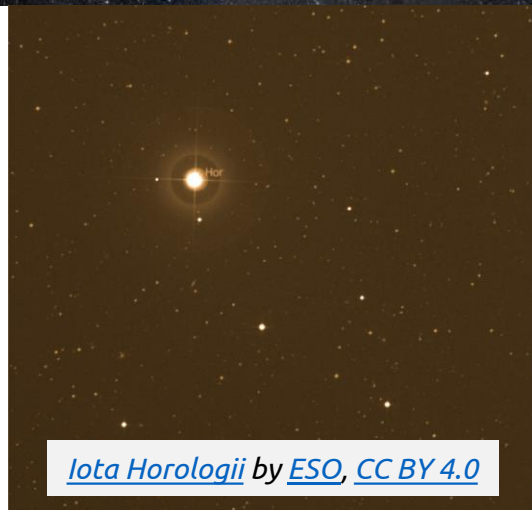


Pleiades to Hyades by *Rodrigo Bernal Adreo* ©

On the origin of the planet-host star iota Horologii

Iván Ramírez

TACOMA COMMUNITY COLLEGE



Iota Horologii by *ESO*, *CC BY 4.0*

An extrasolar giant planet in an Earth-like orbit*

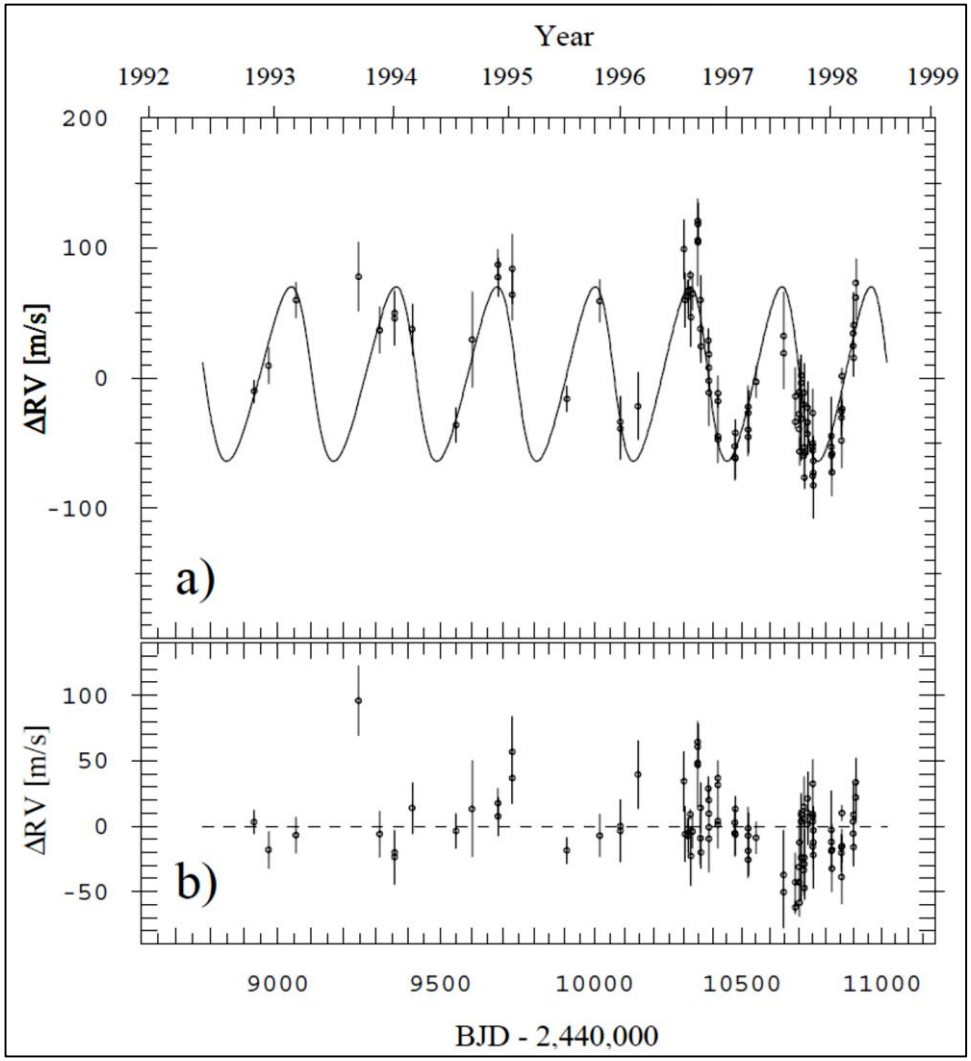
Precise radial velocities of the young star ι Horologii = HR 810

M. Kürster[1], M. Endl[1,2], S. Els[1,3], A.P. Hatzes[4], W.D. Cochran[4], S. Döbereiner[5], and K. Dennerl[5]

$M \sin i \approx 2.3\ M_{\mathrm{Jup}}$

$P \approx 320$ d

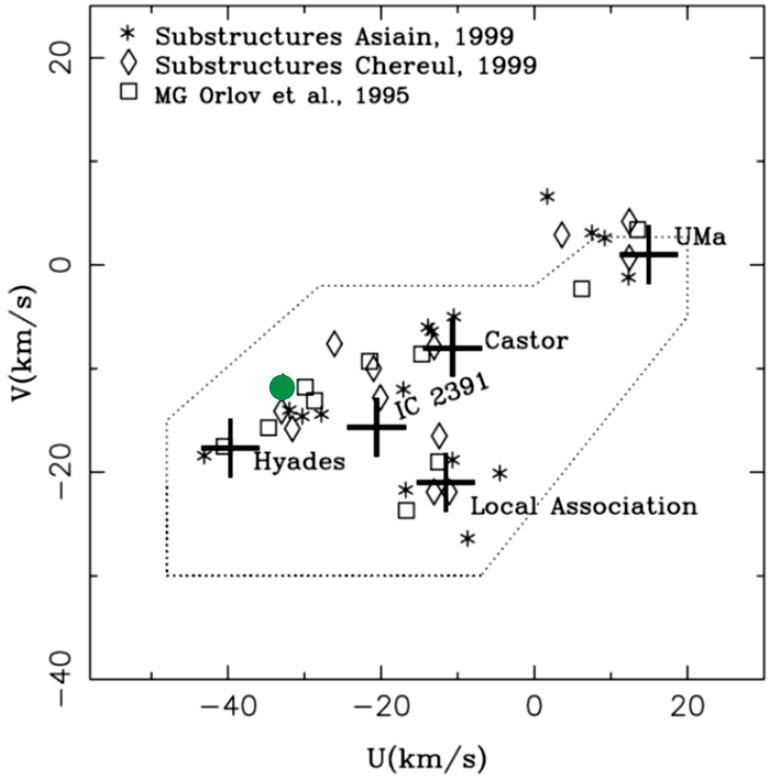
$e \approx 0.16$

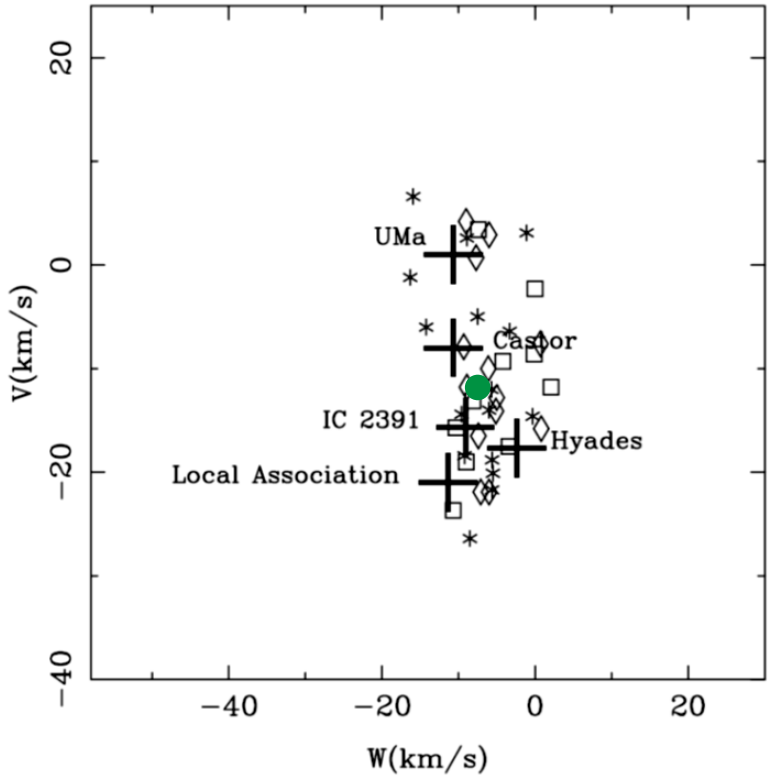


Kurster et al. (2000)

iota Horologii *may* be a Hyades stream star

- It satisfies ***one*** of two conditions by Eggen (1995)
- *Maybe* moving towards Hyades stream convergent point

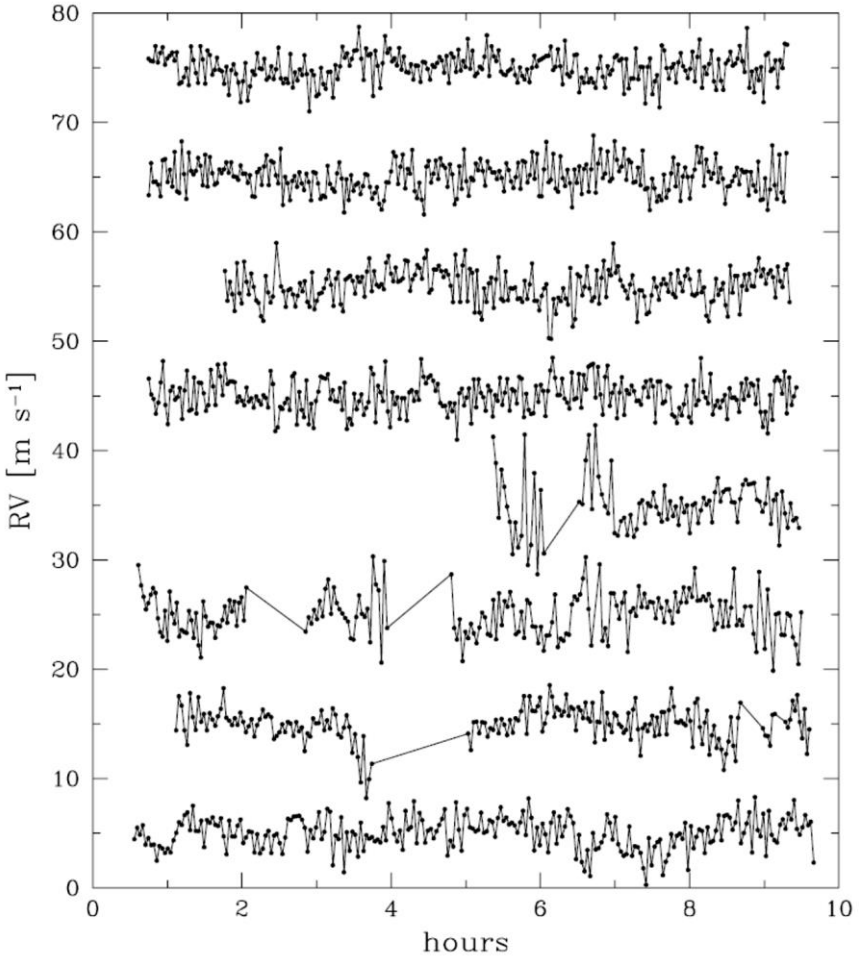




Montes et al. (2001)

The exoplanet-host star ι Horologii: an evaporated member of the primordial Hyades cluster

S. Vauclair[1], M. Laymand[1], F. Bouchy[2], G. Vauclair[1], A. Hui Bon Hoa[1], S. Charpinet[1], and M. Bazot[3]



Vauclair et al. (2008)

- Hyades' [Fe/H]
- Hyades' helium abundance
- Hyades' age

Their 3 best models

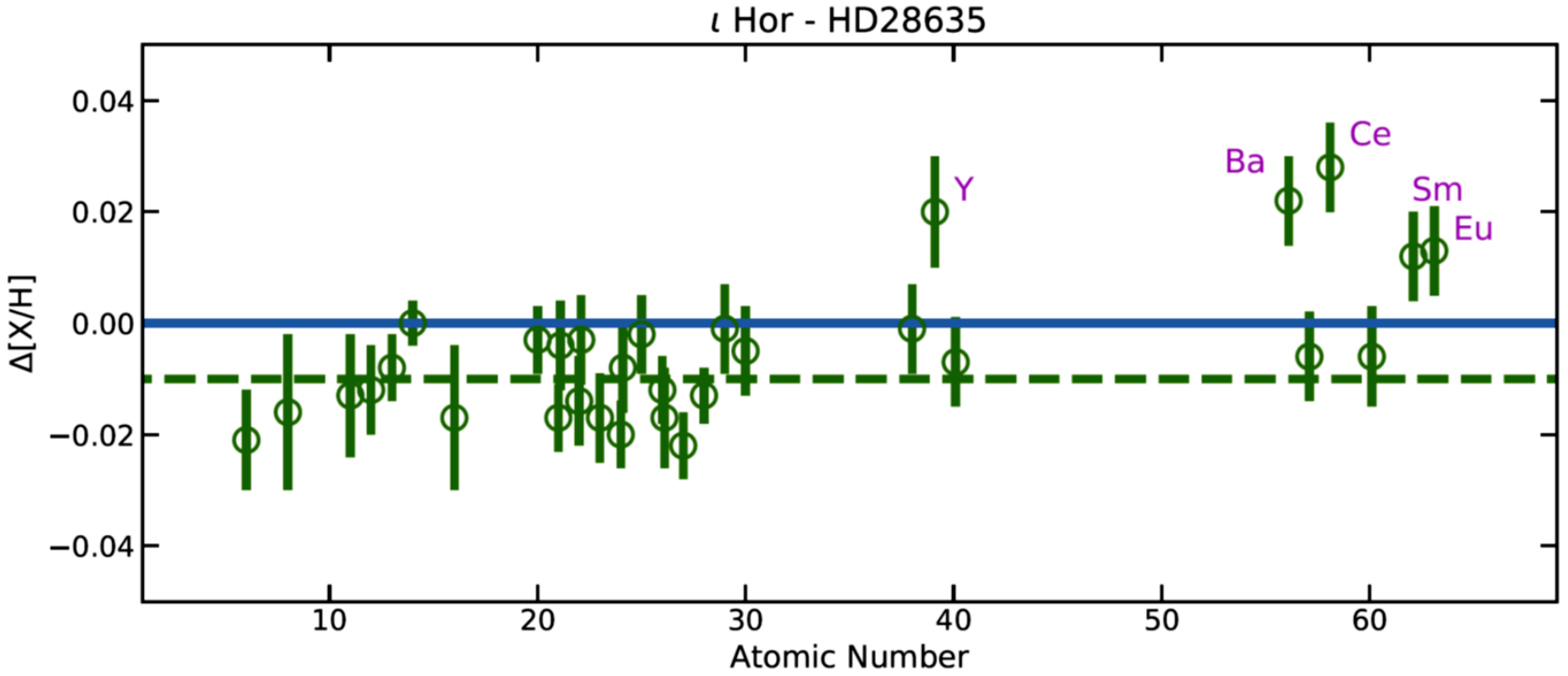
[Fe/H]	0.19	0.19	0.14	0.14 ± 0.05
Y	0.271	0.255	0.255	0.255 ± 0.013
age (Myr)	620	627	627	625 ± 25

Lebreton et al. (2001)

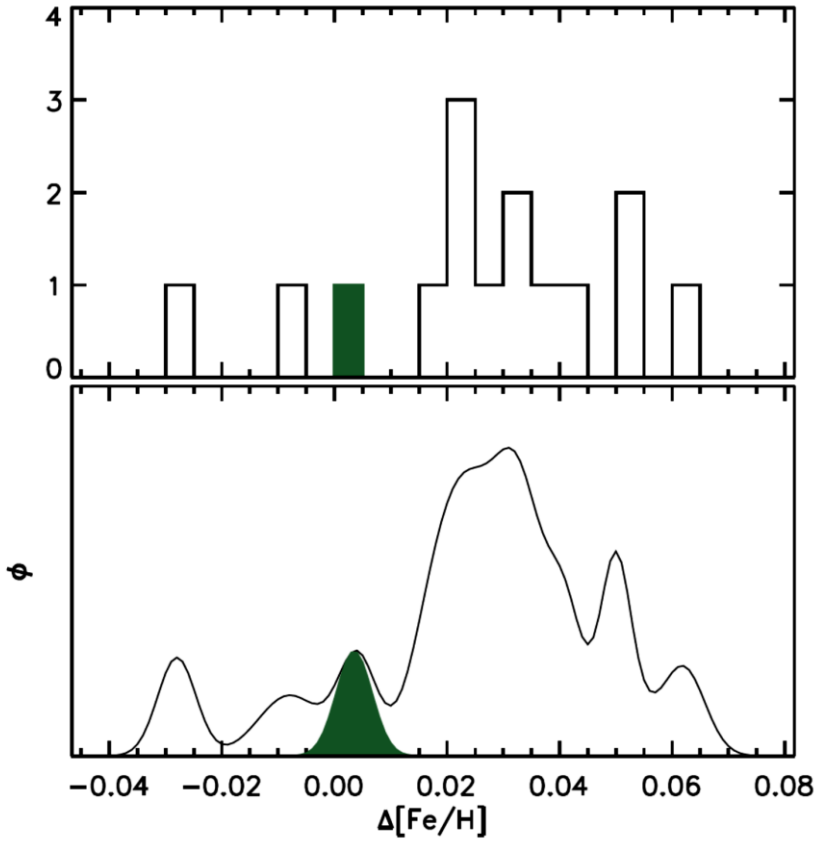
- Helium is a very poor indicator of origin
- Inconsistent helium abundance comparison

iota Horologii *may* have a Hyades-like composition

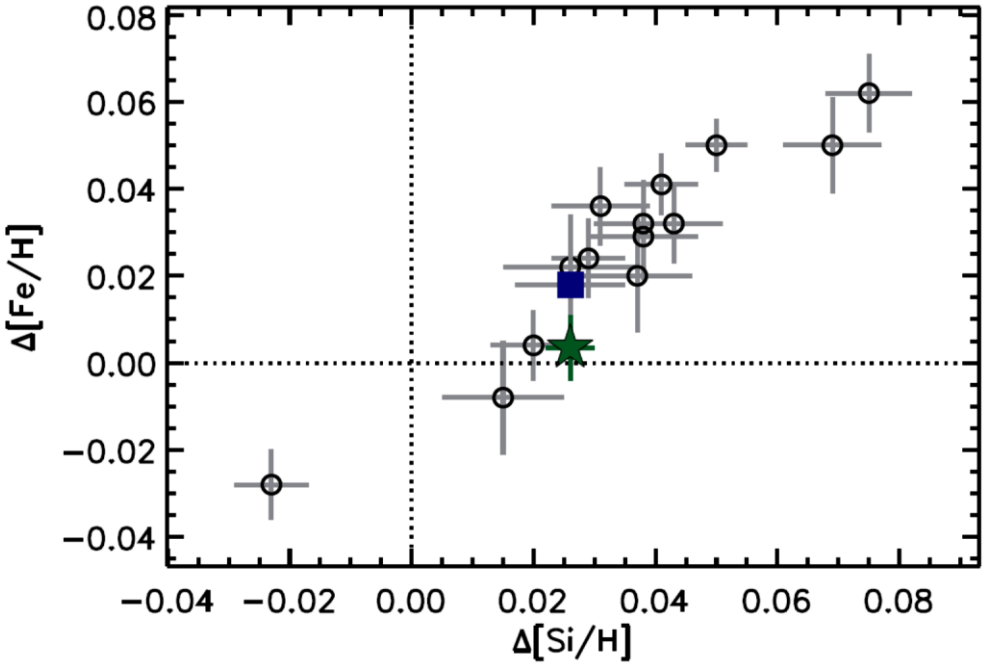
- HARPS spectra + Hyades (Liu et al. 2016)
- Compare to Hyades “twin” → On Liu et al. (2016) scale
- $6 \leq Z \leq 30$: off by –0.01 dex relative to twin, but Hyades-like
- $Z > 30$: half Hyades, half enhanced by ~5±2%

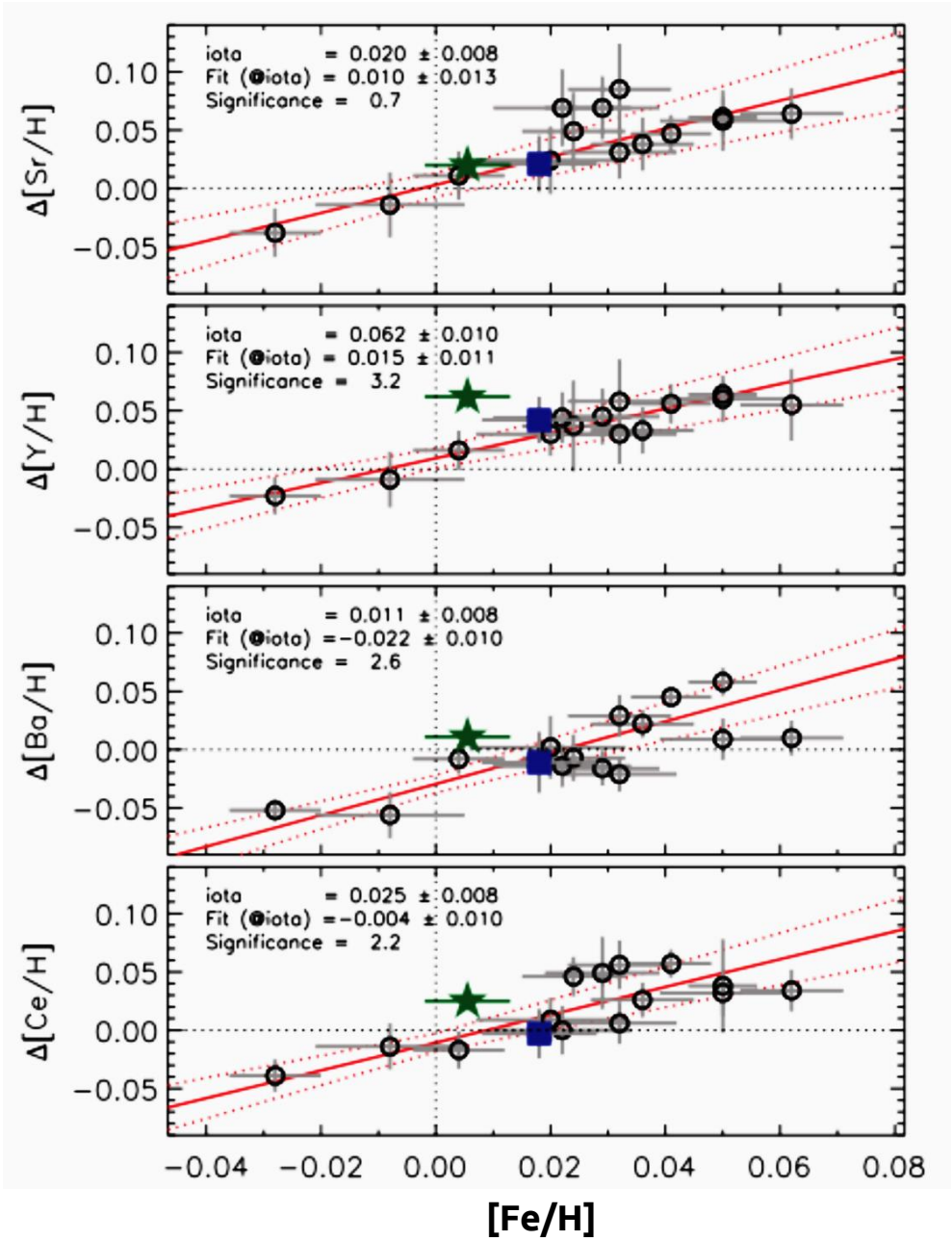


iota Horologii *may* have a Hyades-like composition



- Well within the Hyades' [Fe/H] distribution
- Follows the Hyades' correlations for $6 \leq Z \leq 30$ abundances

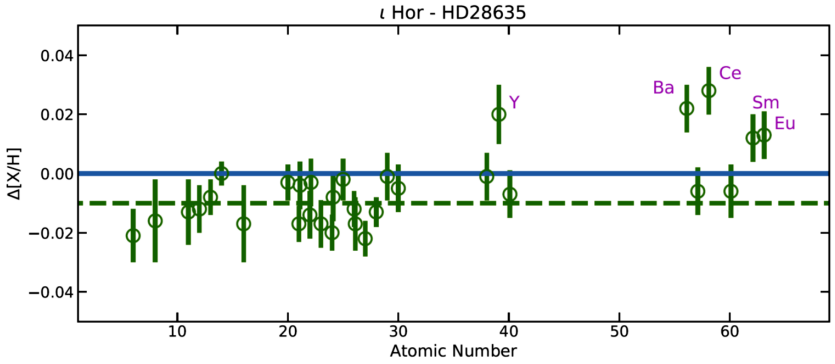




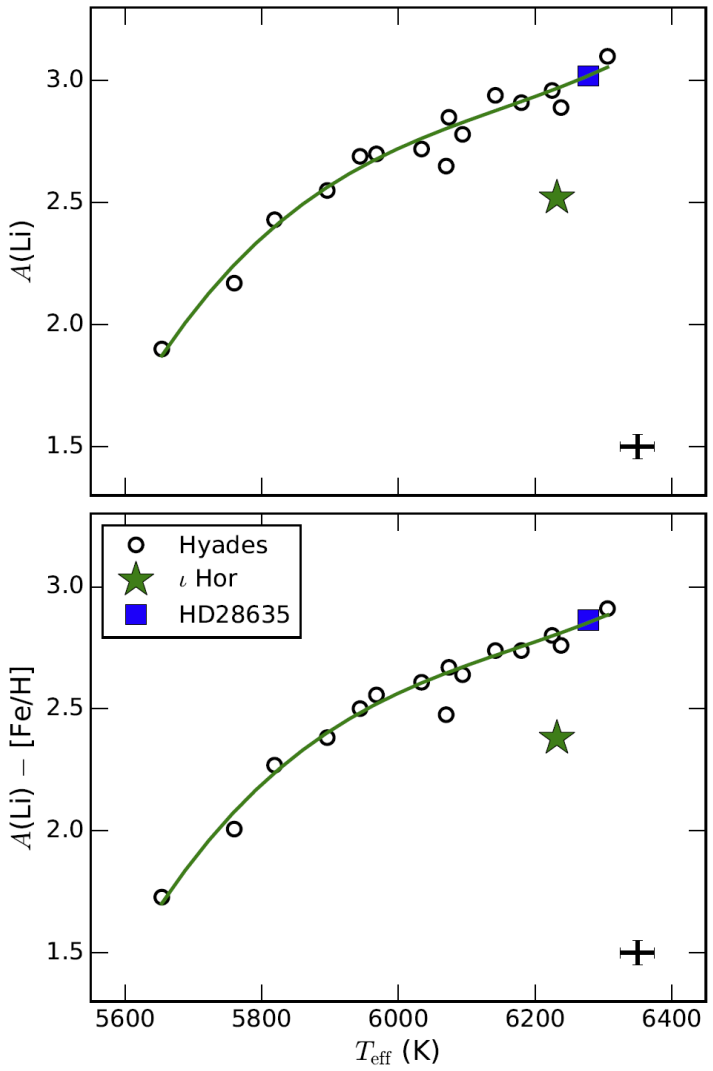
- *Marginally* enhanced in Y, Ba, Ce (+ Sm, Eu?) : 5 ± 2 %

- Hyades do not stand out in standard surveys (e.g., Reddy et al. 2006)

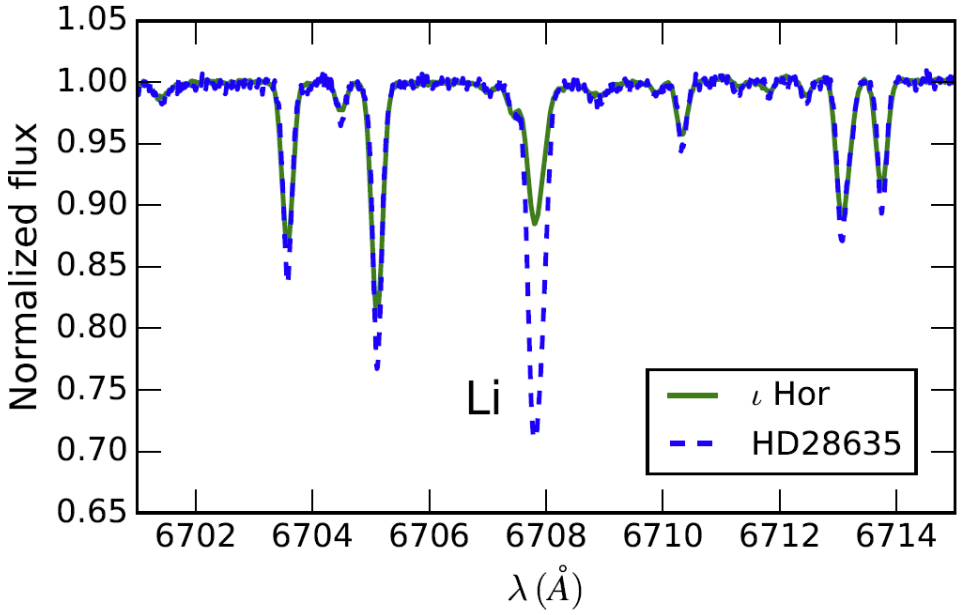
→ iota Horologii easily tagged as a Hyades star (ignore the marginal enhancement?)

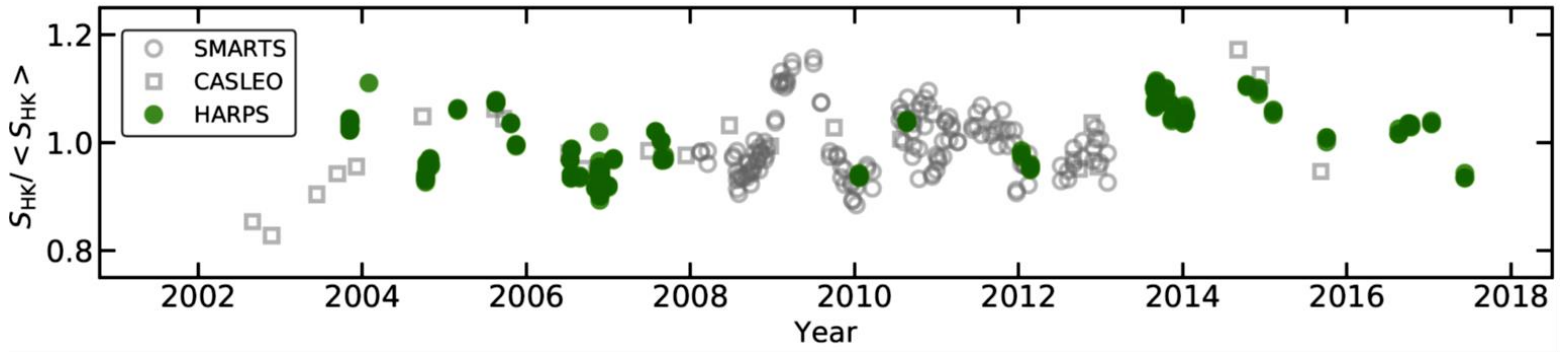


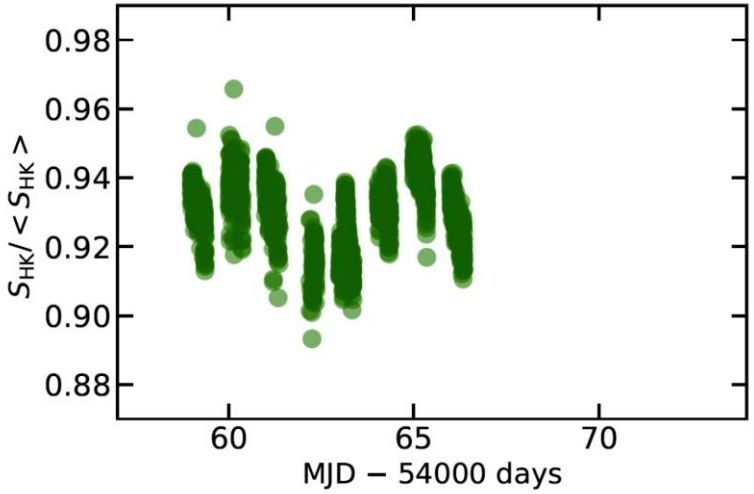
iota Horologii does *not* have a Hyades Li abundance



- Does not fit the Hyades' A(Li)–$T_{\rm eff}$ plot
- About 50% of Hyades' Li content
- If due to its planet, it should have a peculiar rotation

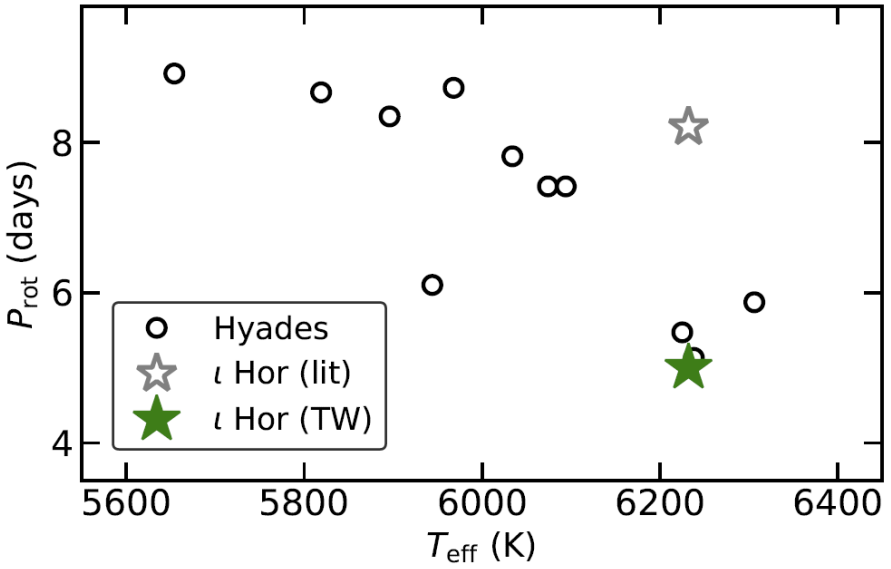






- Lomb-Scargle analysis of entire S_{HK} time-series suggest $P_{rot} \approx 8$ days
- But: **P_{rot} = 4.9 days**

- If a Hyades star, iota Horologii's P_{rot} is not peculiar



IOTA HOROLOGII IS UNLIKELY TO BE AN EVAPORATED HYADES STAR

I. Ramírez[1], D. Yong[2], E. Gutiérrez[3], M. Endl[4], and D. L. Lambert[4]

- Probably not a Hyades stream star
- Helium abundance connection is weak/inconsistent
- $6 \leq Z \leq 30$ and/or standard precision → Hyades!
- Heavy metals: marginally enhanced
- Lithium: too low, no peculiar rotation
- It may have formed 100's of parsecs away from Hyades