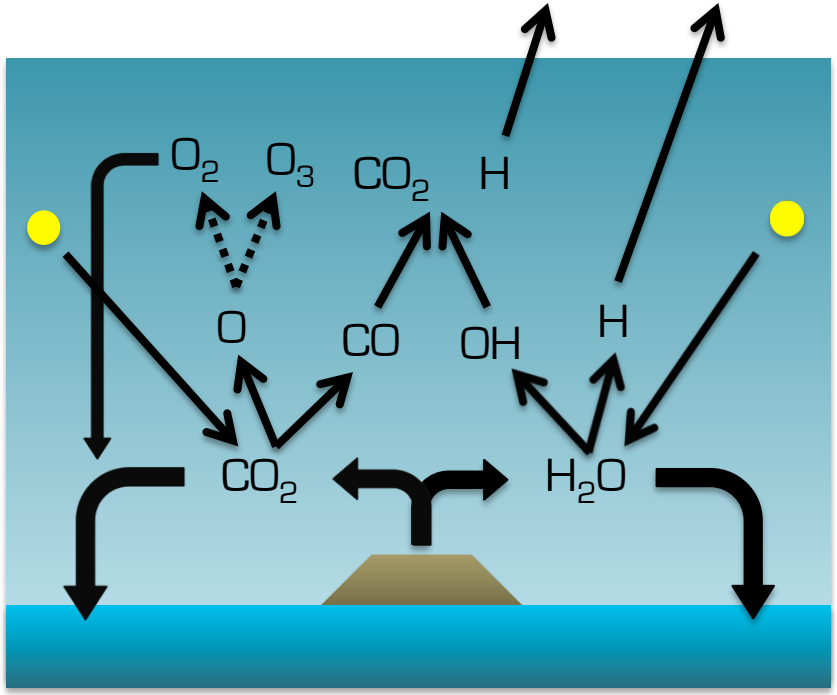
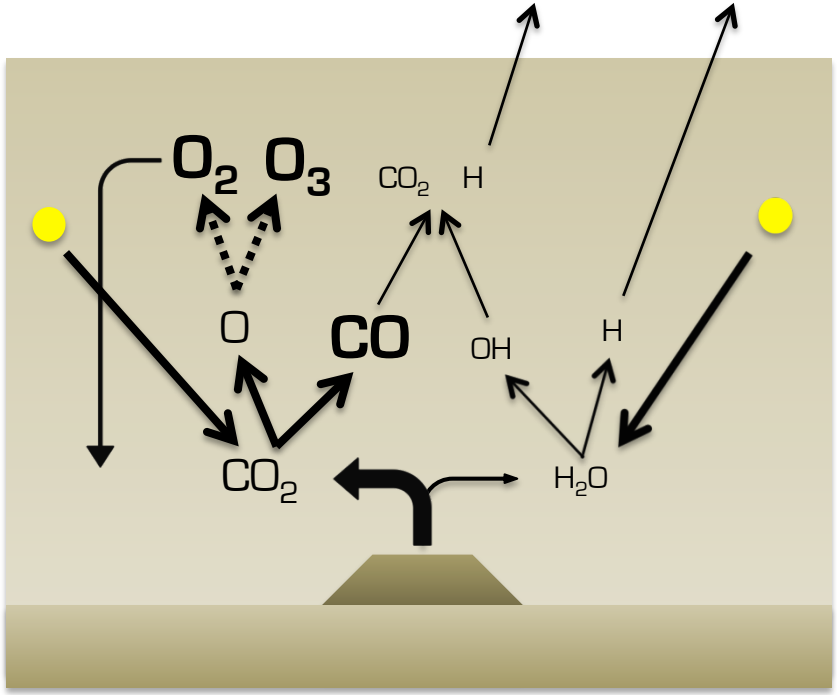
#63429: Stability of CO_2 Atmospheres on Desiccated M Dwarf Exoplanets

Peter Gao, Renyu Hu, Tyler D. Robinson, Cheng Li, and Yuk L. Yung

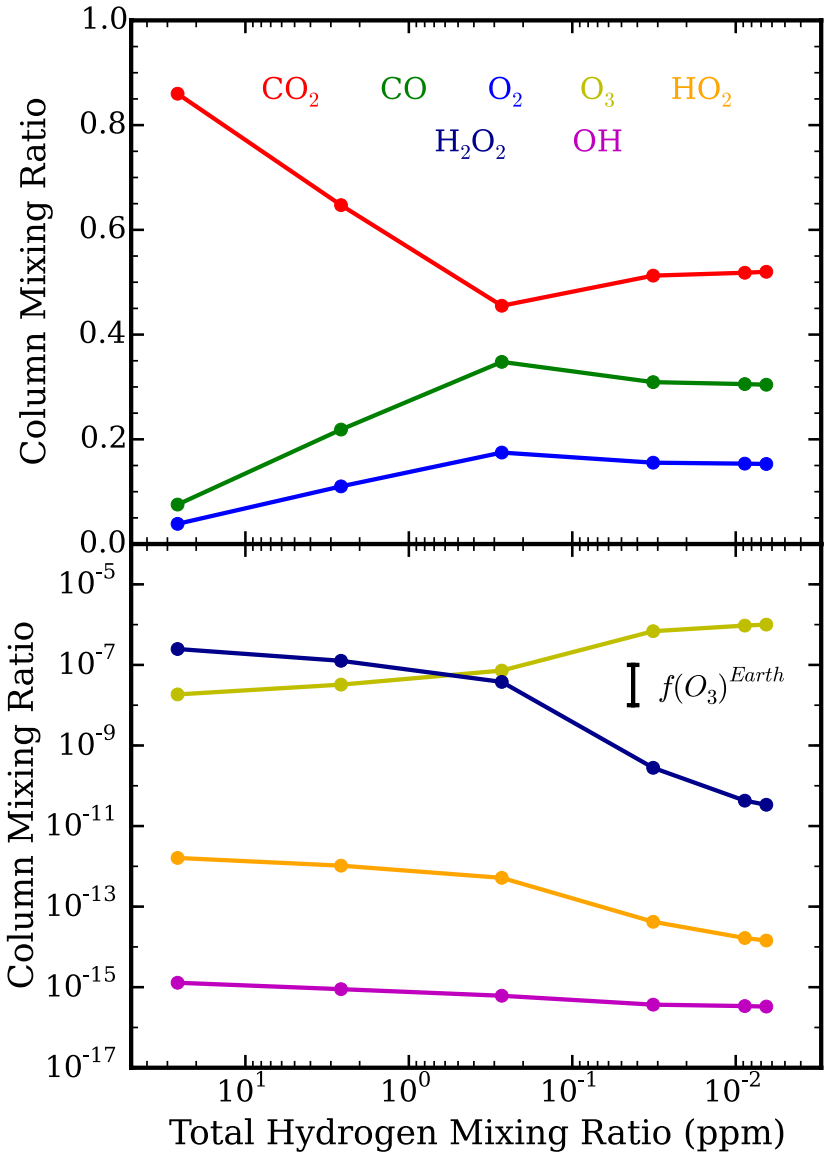
Terrestrial planets orbiting M dwarfs in their main sequence habitable zones could suffer severe water loss and oxidation due to the high luminosity of M dwarfs during their pre-main sequences (Hamano et al. 2013, Luger & Barnes 2015, Tian & Ida 2015).

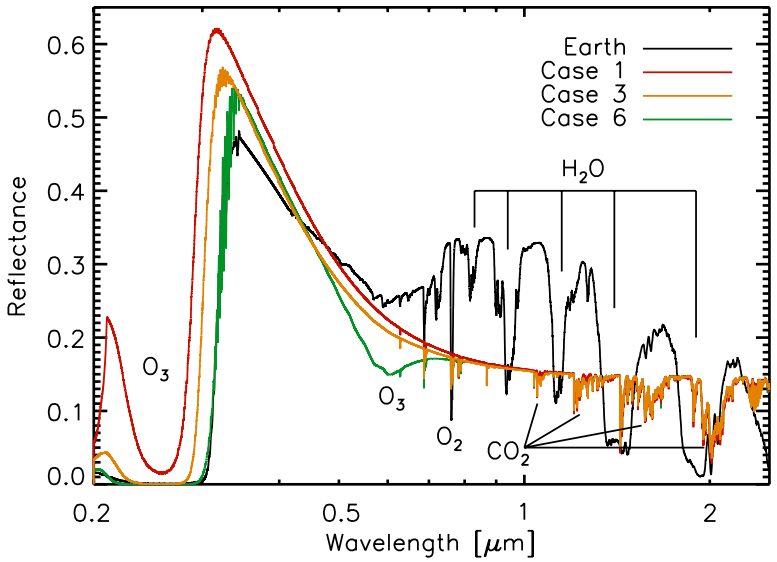


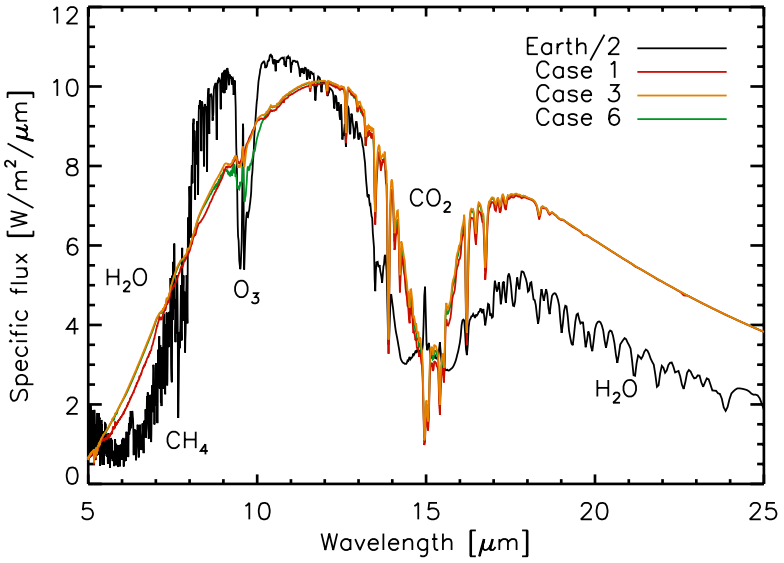


#63429: Stability of CO_2 Atmospheres on Desiccated M Dwarf Exoplanets

Peter Gao, Renyu Hu, Tyler D. Robinson, Cheng Li, and Yuk L. Yung

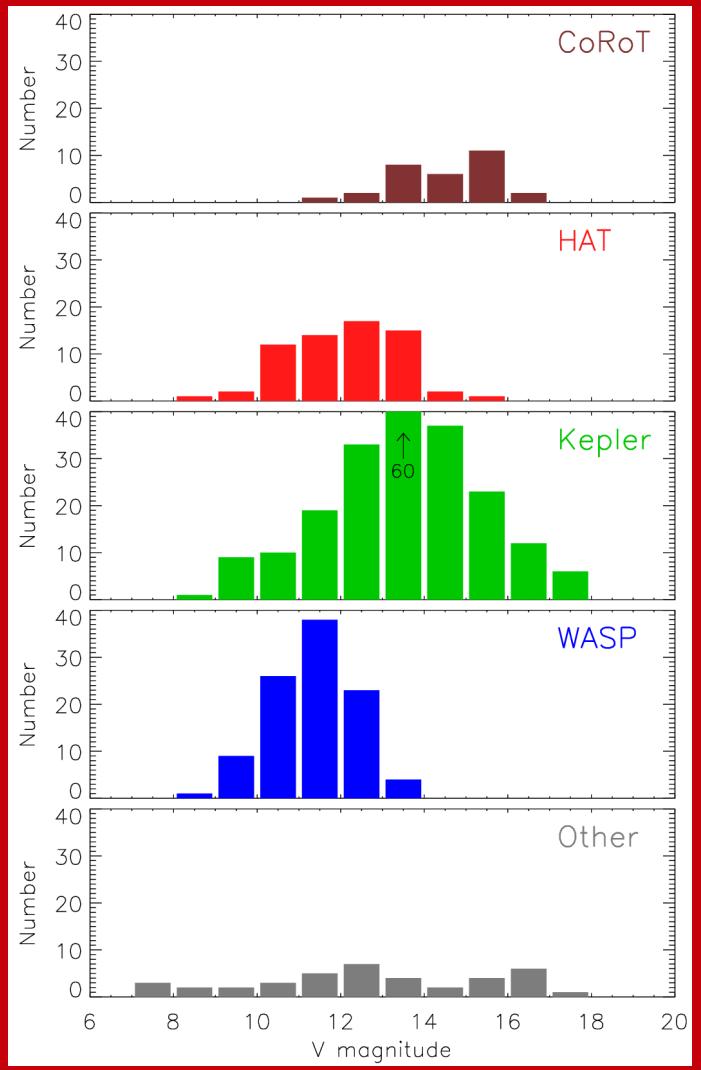






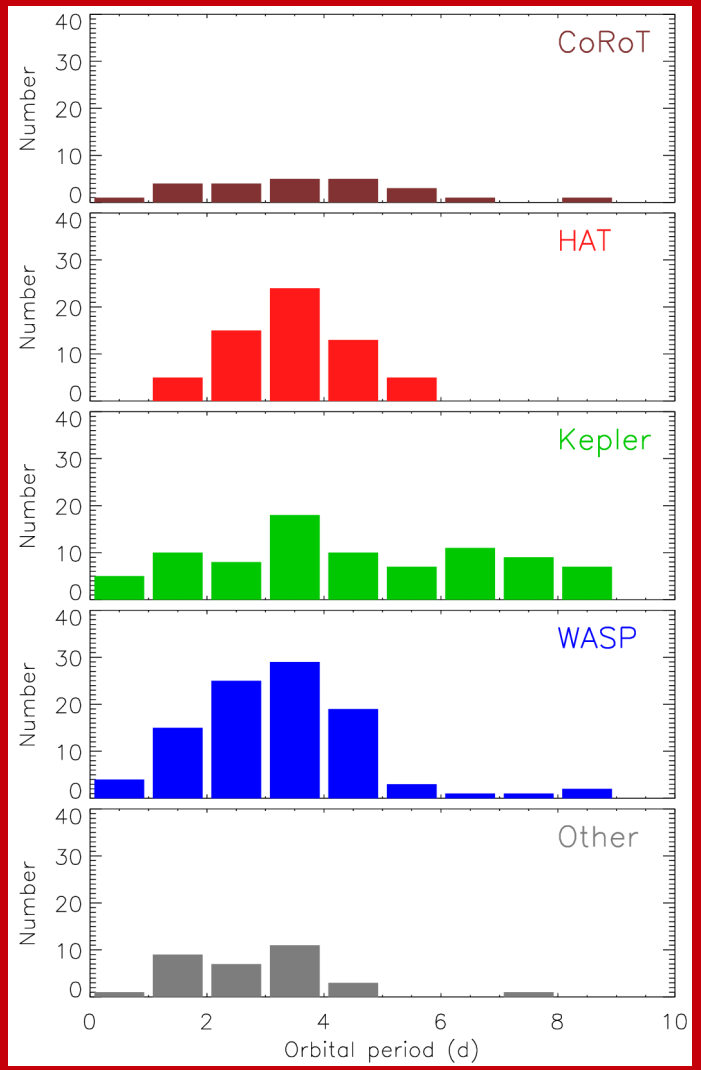
COMPARISON OF THE PLANETARY SYSTEMS FOUND BY DIFFERENT TRANSIT SURVEYS

John Southworth
Keele University

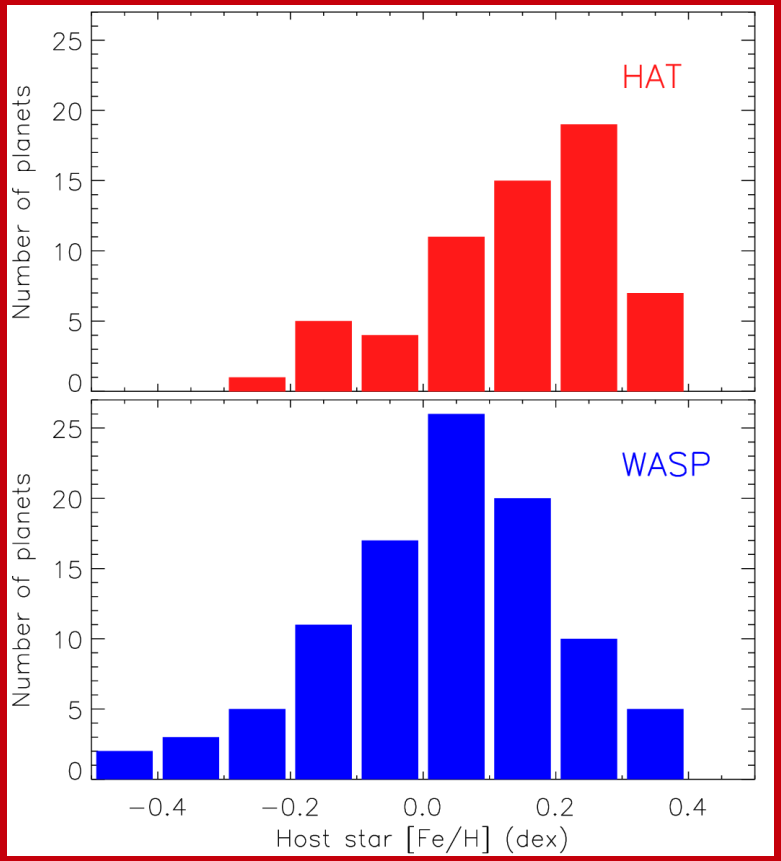


V-band magnitudes of transiting planet host stars found from different surveys

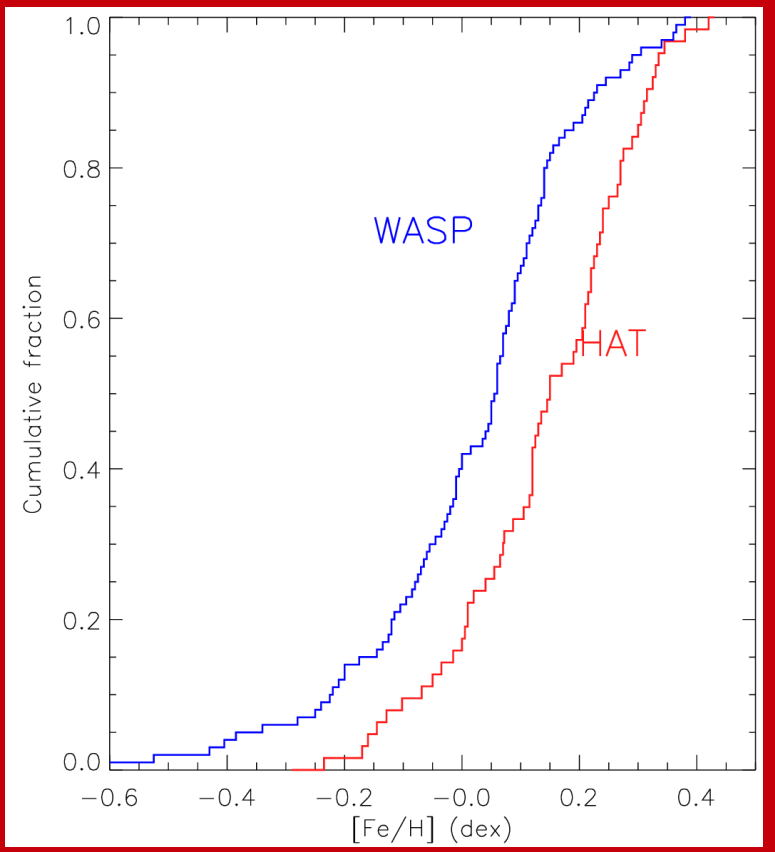
Orbital periods of the transiting planets from different surveys (1-10 days only)



Comparison between the WASP and HAT surveys



[Fe/H] values for HAT (red) and WASP (blue)



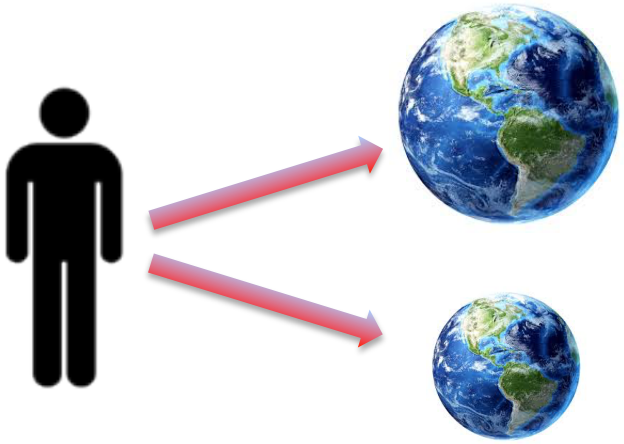
Cumulative distributions of the [Fe/H] values

The samples of planets and host stars are the same

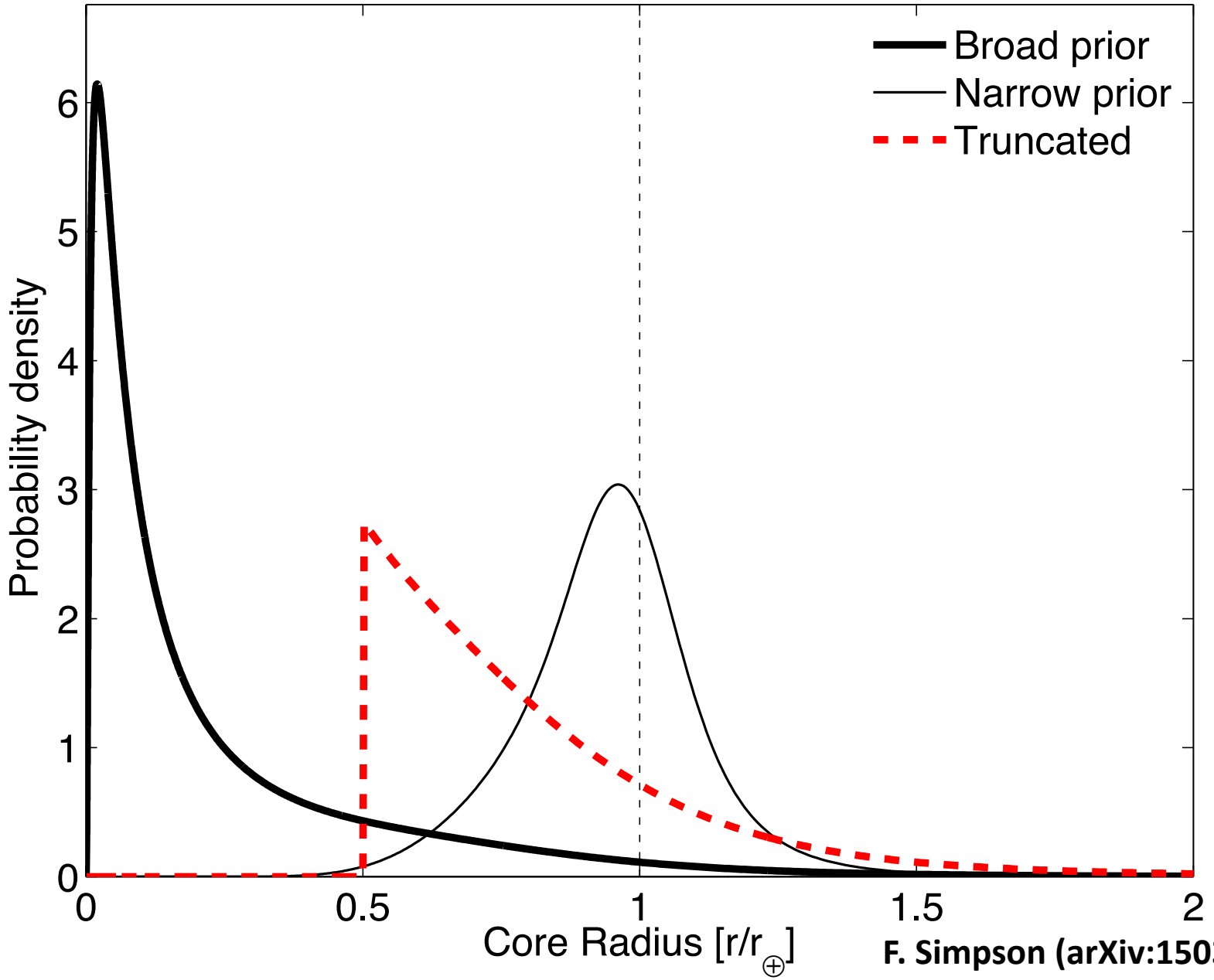
But the [Fe/H] values disagree (0.01% probability)

Systematic error of 0.12 dex in [Fe/H] scale?


20
FR
1927
FIFA



The Size Distribution of Inhabited Planets



F. Simpson (arXiv:1503.07804)

CELESTA: the Catalog of Earth-Like Exoplanet Survey Targets

Colin Orion Chandler[1], Iain Mcdonald[2], & Stephen Kane[1]

[1]San Francisco State University [2]Jodrell Bank Centre for Astrophysics

Introduction

CELESTA provides a database of habitable zones as a target selection tool for ongoing and future missions.

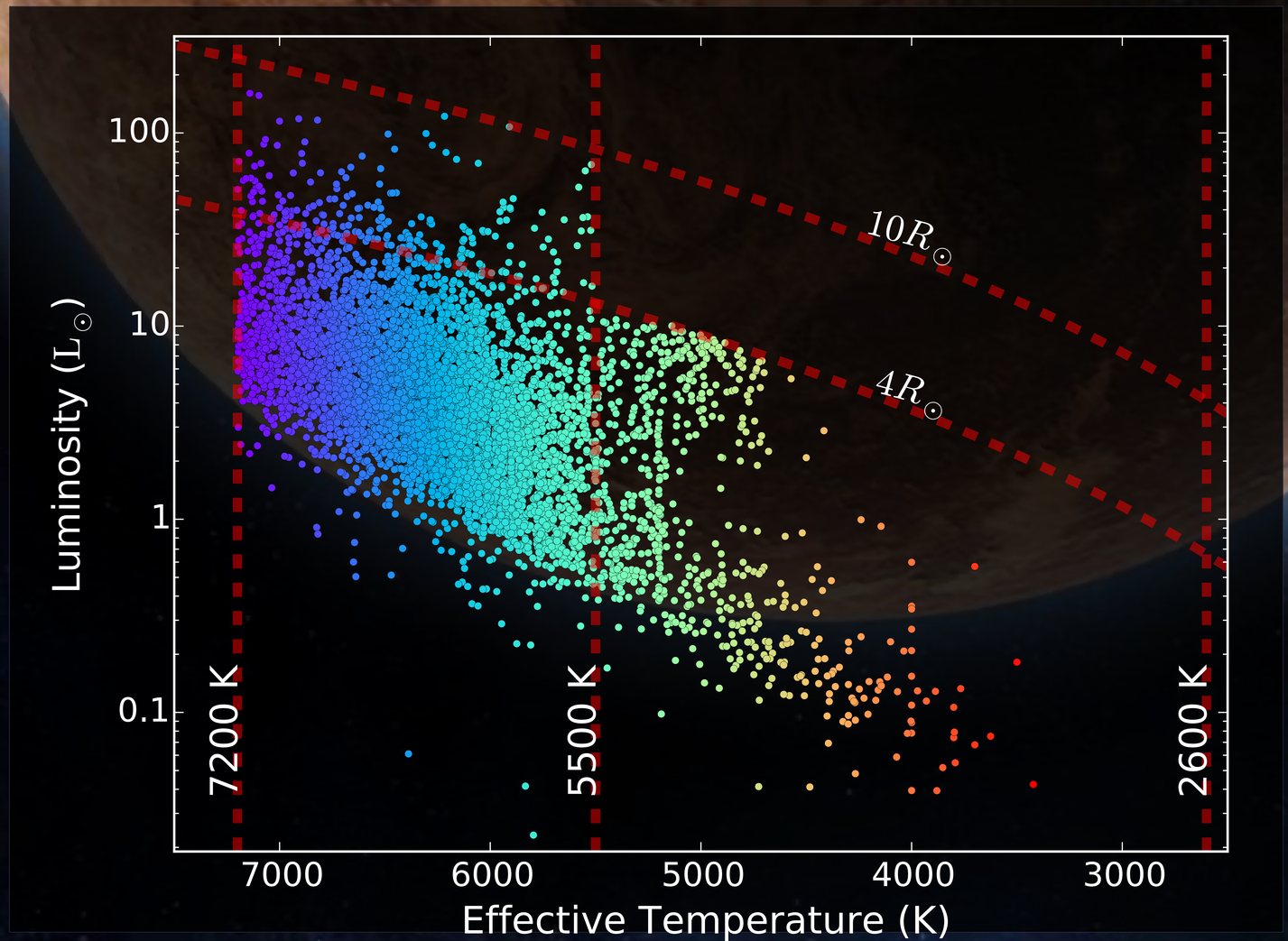
Step 1: Aggregate Data

Star catalogs utilized for stellar parameters:

- Hipparcos: parallax for distances.
- We created a Stellar Parameter Catalog building upon the work of McDonald et al.[3]: stellar tempratures and luminosities.
- Kopparapu et al.[2]: HZ coefficients
- Gaia: future ugprades to CELESTA

Step 2: Star Selection

- Stellar temperature: 2,600 K to 7,200 K.
- Error in parallax: <30 % for analysis
- Main-sequence (MS) branch stars, chosen by radii.



SAN FRANCISCO STATE UNIVERSITY

Visit CELESTA.info
for more information.

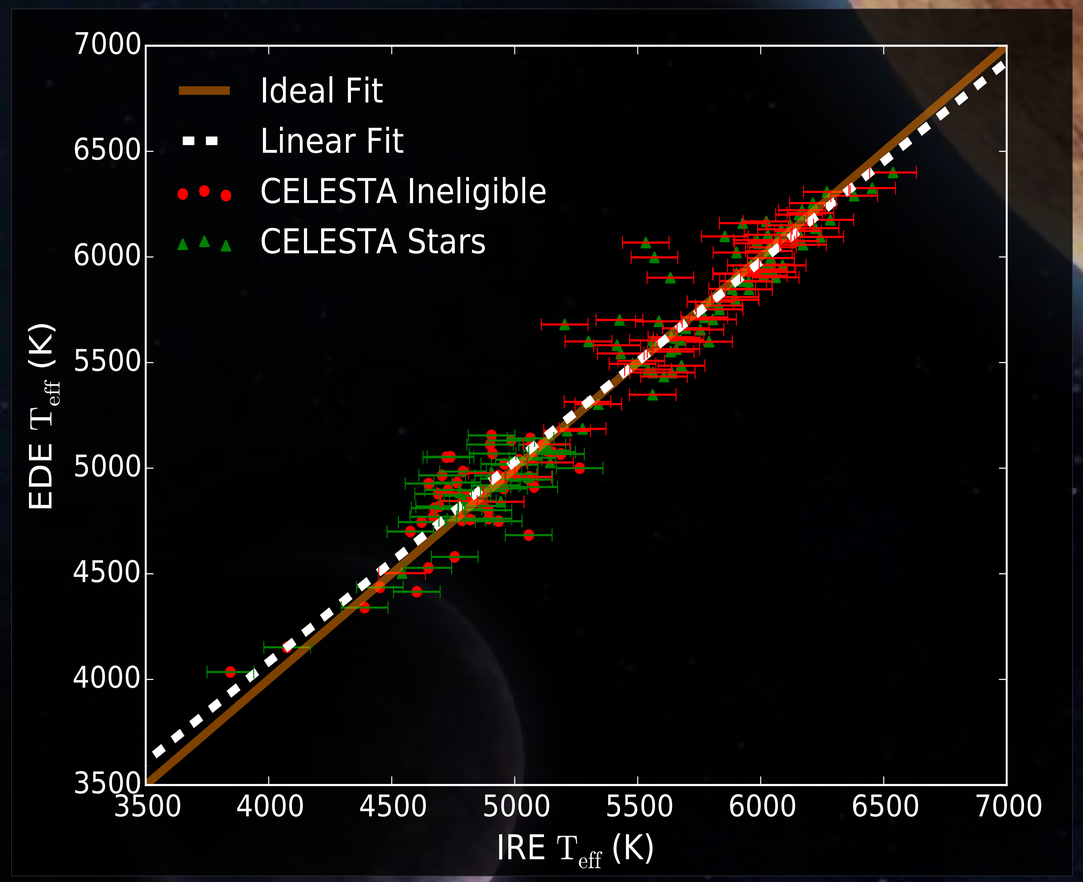
CELESTA: the Catalog of Earth-Like Exoplanet Survey Targets

Colin Orion Chandler[1], Iain Mcdonald[2], & Stephen Kane[1]

[1]San Francisco State University [2]Jodrell Bank Centre for Astrophysics

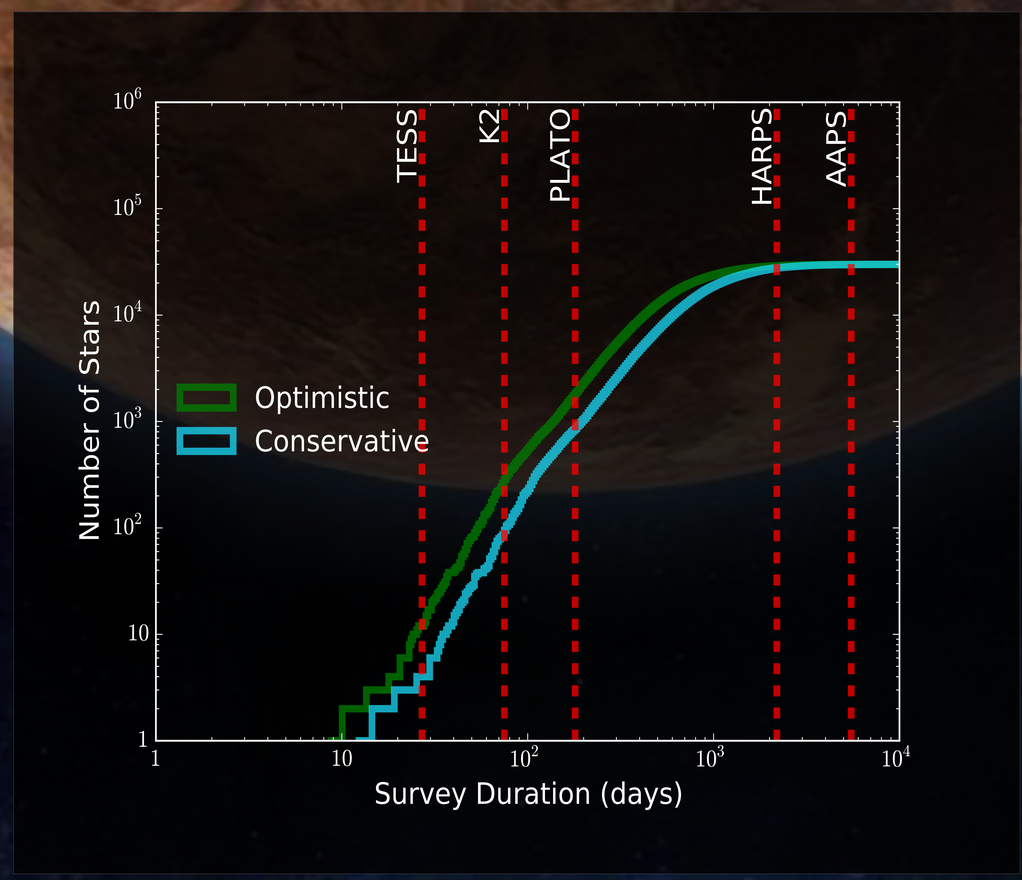
Step 3: Analyze

- Comparison of CELESTA to EDE[1]
- Uncertainty in CELESTA temperature: ±100 K.



Step 4: Application

- CELESTA is as an input catalog for target selection with current and upcoming exoplanet surveys.
- Transit and radial velocity (RV) survey sensitivity to planets within the HZ increases as the survey duration increases.



References

[1]http://www.exoplanets.org

[2]Kopparapu, R.K. et al., 2014. Habitable Zones around Main-sequence Stars: Dependence on Planetary Mass. Astrophysical Journal Letters, 787(2), p.L29.

[3]McDonald, I., Zijlstra, A.A. & Boyer, M.L., 2012. Fundamental parameters and infrared excesses of Hipparcos stars. Monthly Notices of the Royal Astronomical Society, 427(1), pp.343–357.

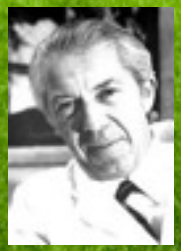
SAN FRANCISCO STATE UNIVERSITY

Visit CELESTA.info for more information.

THE HOMOGENEITY OF NATURE PRINCIPLE AND LIFE AS COSMIC IMPERATIVE

LUDWIK KOSTRO -physicist (studied: Sapienza, Rome)
-philosopher (studied Gregorianum, Rome),
-present affiliation: ATENEUM School of Higer Education, Gdańsk, Poland,
-Prof. emeritus University of Gdańsk

The homogeneity principle plays a fundamental part in scientific thinking. It confers to it an enough high degree of sureness. The purpose of my litle contribution is to show that it conducts us even to the statement that life is a cosmic imperative as was indicated by Christian de Duve. We can be enough sure that we are going to discover step by step the second Big Bang. The Big Bang of life, consciousness and intelligence



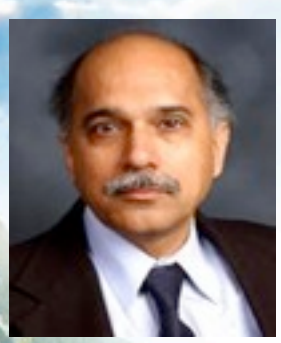
Nobel Price Christian de Duve

The homogeneity principle can be defined:

What the laws of nature admit here and now happens spontaneously everywhere in space-time, under similar competent conditions. This definition concerns also statistical laws: the same statistical physical phenomena given the same statistical circumstances run spontaneously the same statistical way.

The homogeneity principle is inscribed in the mathematical structure of physics thanks to Emmy Noether as regards the classical physics,

Emmy Noether's theorema of universality of laws



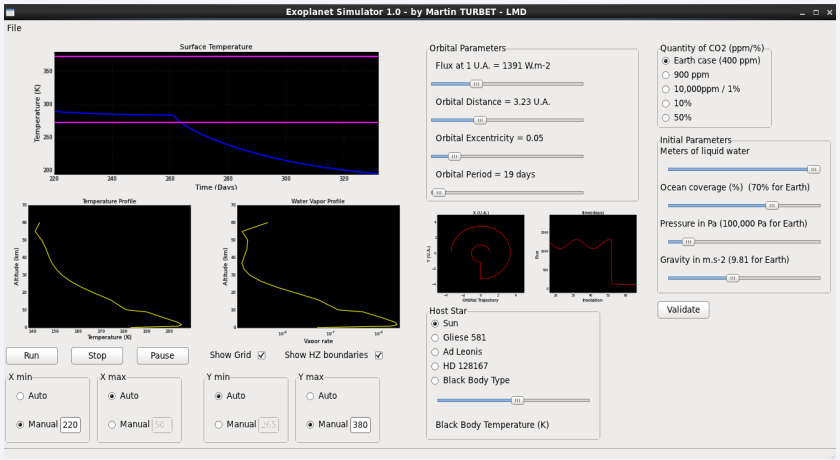
Ramamurti Shankar

and, among others, thanks to Ramamurti. Shankar as regards QM.
They have shown that the laws of Nature are invariant with respect(1) to the displacement in space what finds its expression especially in the conservation law of momentum, (2) with respect to the displacement in time what finds its expression especially in the conservation law of energy (3) and with respect to rotation what finds its expression especially in the conservation. law of angular momentum

Not every physicist and philosopher are aware of this fact.

The Habitability of terrestrial exoplanets with a time-marching climate model : an educational tool.

M. Turbet, F. Forget, J. Leconte, C. Schott



A GCM that reproduces the Classical limits of the HZ and their dependencies to :

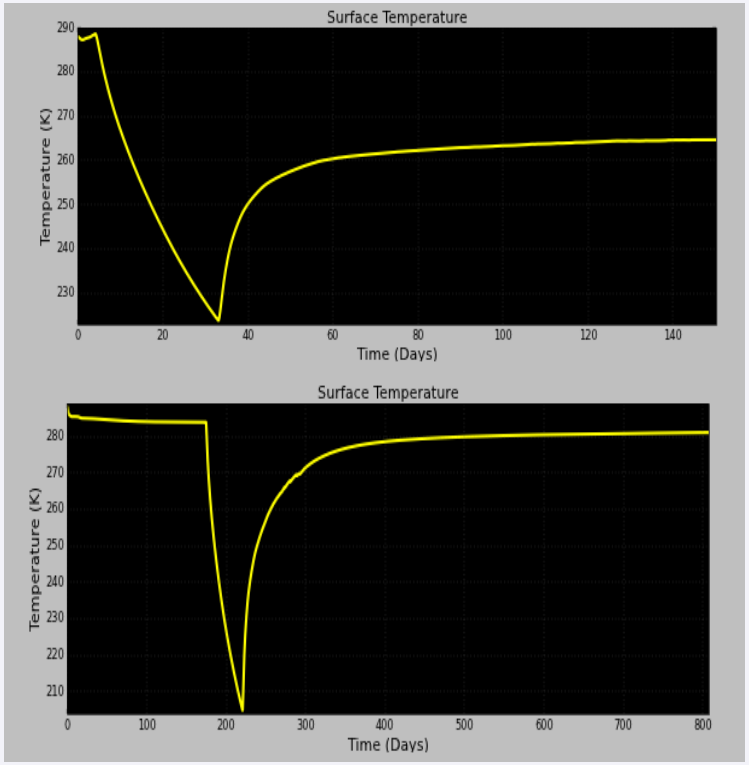
- **the External Forcing**
  (Insolation, Star spectrum, ...)
- **the Planet**
  (Gas composition, Surface pressure, Amount of water, ...)

LMD

ESEP

1794
ENS
ÉCOLE NORMALE SUPÉRIEURE

A user-friendly accelerated Climate Model for students to understand the Habitable Zone limits



An exemple, the **Outer Limit of the HZ** :

- around Sun-like Stars.
- around M-Stars.

Come at my Poster Presentation for the GCM live show !