



ExoClock Newsletter

Dear ExoClock participants,

Hope you are all doing well!

We would like also to welcome the new members!

We send out a newsletter like this at the beginning of every month, while you can read the past newsletters, watch the past meetings, and have access to other educational material at:

www.exoclock.space/users/material

We organise meetings dedicated to new ExoClock members. These meetings are held just after our regular monthly meeting. The beginner's meeting is usually held on the Friday after our regular meeting or the week after. In these meetings, newcomers can ask questions of any level related to the operation of the website, observations of transits, data analysis etc. Note that these meetings are not recorded.

Finally, ***we have a Slack channel*** for more direct communication and if you want to join, follow this link:

https://join.slack.com/t/exoclock/shared_invite/zt-1t5l875v6-x0s8s553kT8nbCvbyo7boA

In this newsletter, we discuss:

1. Announcements

1.1. Meetings and activities - ExoClock Annual Meeting

1.2. Visit at DCU, Ireland

1.3. ExoClock Unlocked

1.4. An inspiring observation

1.5. Certificates of Contribution

1.6. Edu activity for high schools

2. Highlighted Observations

3. Exoplanet CV of LTT 1445Ab

1. Announcements

1.1 Meetings and activities

Monthly meeting and Beginners meeting

The next beginners meeting will be tomorrow Thursday 5th of December at 16:00 UTC.

This is the link to join the meeting:

<https://ucl.zoom.us/j/92217314225>

ExoClock Annual meeting – Lisbon, 26th and 27th of October

The 4th Annual ExoClock Meeting was held last month in Lisbon, and it was hosted by the Faculty of Sciences. The meeting was attended by 60 people in person and around 70 people online. Thank you everyone for this fantastic and fruitful meeting! We heard very interesting presentations by partners, ExoClock participants, Ariel consortium participants and other collaborators.

Our annual meeting this year occurred just before the Ariel Consortium meeting, and we got the opportunity to meet in person several Ariel consortium members!

The agenda of the meeting can be found here:

https://www.exoclock.space/annual_meetings

If you attended the meeting either in person or online, we would appreciate to hear your feedback. Please fill in the following form, and thanks to those who have done it already!

<https://docs.google.com/forms/d/e/1FAIpQLSctVwESJIXliq1bW5VQpoGXXLrvaIAenW5P6LKaThceCWkDg/viewform>

If you didn't attend the meeting or missed some parts, you can watch the recordings which will be uploaded on the website soon. We will keep you posted!

Here you can see our group photo!



Local media and outreach event in Portugal

In the context of both the ExoClock and the Ariel meetings, our project got the chance to be depicted in some Portuguese news.

<https://diariodalagoa.pt/clube-de-astronomia-da-lagoa-participa-em-eventos-internacionais>

We also had the chance to participate in the public event that was organised for Ariel during the Ariel Consortium meeting (photo below).



1.2 Visit to Dublin City University- seminar and outreach event

On 20th of November we visited Dublin City University in Ireland. We were invited by Oisín Creaner (the creator of the Star Guide program) to give a seminar to the students and hold presentations for the public. Below you can find some photos from the outreach event at DCU.



If you have done an outreach activity related to ExoClock/ Ariel or you would like to organise something in your local area, please contact us. We would love to hear and help with material!

1.3 ExoClock Unlocked!

ExoClock Unlocked - become an exoplanet explorer and support a real space mission!

ExoClock Unlocked is a dedicated program for astronomy enthusiasts aiming to engage them in exoplanet research. No telescope is needed and there are no requirements to participate, just the motivation to learn about exoplanets!

In this project, participants will be using remote observing telescopes to observe exoplanet transits, and support the upcoming ESA's Ariel space mission which will study exoplanet atmospheres. ExoClock Unlocked is open to everyone without access to observational equipment, from amateur astronomers, students to citizen scientists. The program welcomes participants from all over the world, all backgrounds and experience levels.

Through online monthly training sessions, participants will perform remote observations, analyse the obtained data and contribute to a real space mission. In the program, participants will have the opportunity to get training by experts in exoplanet science and scientists from the Ariel mission. User-friendly tools, educational material, and step-by-step guidance will ensure that everyone can participate and learn about exoplanet transits at their own pace. Upon completing a successful observation, participants receive a certificate acknowledging their contribution to exoplanet research and become co-authors in ExoClock publications.

The ExoClock team welcomes all interested people to this interactive initiative—a unique opportunity to discover the fascinating science behind exoplanets!

In this program, most of the observing time is a kind contribution of the LCO facilities (Las Cumbres Observatory).

The application is open and free to everyone but there will be a fee for those who will eventually participate to cover the training sessions, admin work and some extra observing time that might be needed to request.

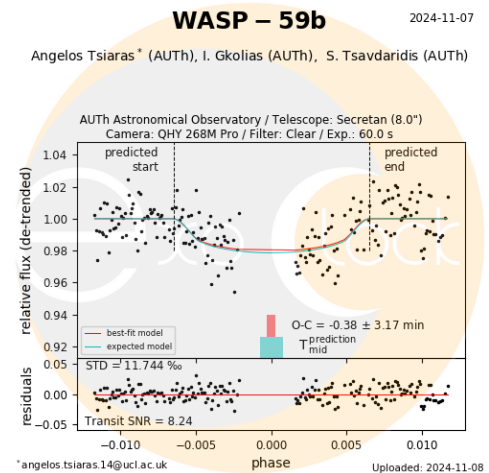
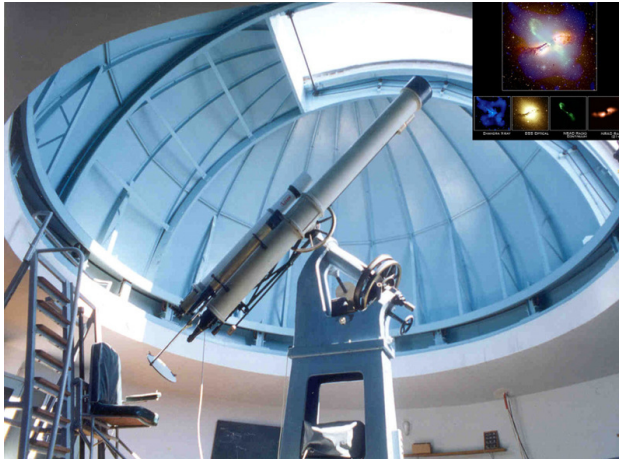
Applications are open until the **15th of December**.

The link to apply: https://www.exoclock.space/exoclock_unlocked

Please spread the news with interested people in your communities!

1.4 Inspiring Observation from the Old Observatory, Aristotle University of Thessaloniki

Recently, a very inspiring observation has been performed using the old telescope in the Astronomical Observatory of the School of Physics at the Aristotle University of Thessaloniki (AUPh). Angelos Tsiaras, ExoClock coordinator and a professor at the department, led this effort in order to bring the telescope back into use for research. The telescope is a 20cm refractor built in the 50s and the observatory is located at the centre of the city, which makes it even more challenging. Congratulations to the team of the AUPh Astronomical Observatory!



1.5 Certificates of contribution

Congratulations to the new entries in our top-contributors!

Bronze Observers (50+ observations): Yen-Hsing Lin, Deborah Jean Smith, Ian Sharp, Pieter Vuylsteke, Vikrant Kumar Agnihotri, Francesco Scaggiante, Charlie Miller, Sacha Foschino, Kevin Johnson, Matthieu Bachschmidt, Lionel Rousselot, Nikolaos I. Paschalis, Tõnis Eenmäe

Silver Observers (100+ observations): Ramon Naves, Robert Roth, Miguel Ángel Álava-Amat, Dimitris Stouraitis

Gold Observer (500+ observations): Paolo Arcangelo Matassa

All participants mentioned here have received their certificates via email.

1.6 Educational activity for high school students

Recently, a dedicated educational activity developed by Anastasia Kokori was published in the AstroEdu journal. The activity is aimed to high school students, it is low cost and can be covered during the class in two school hours.

What is the activity about?

Measuring the size of an exoplanet with real data!

- How do astronomers measure the size of exoplanets?
- What can a light curve say about the nature of the planet?
- Particularly, how do we know how big or small exoplanets are?

In this activity students will use real data of a telescope to measure the size of an exoplanet, just as astronomers do.

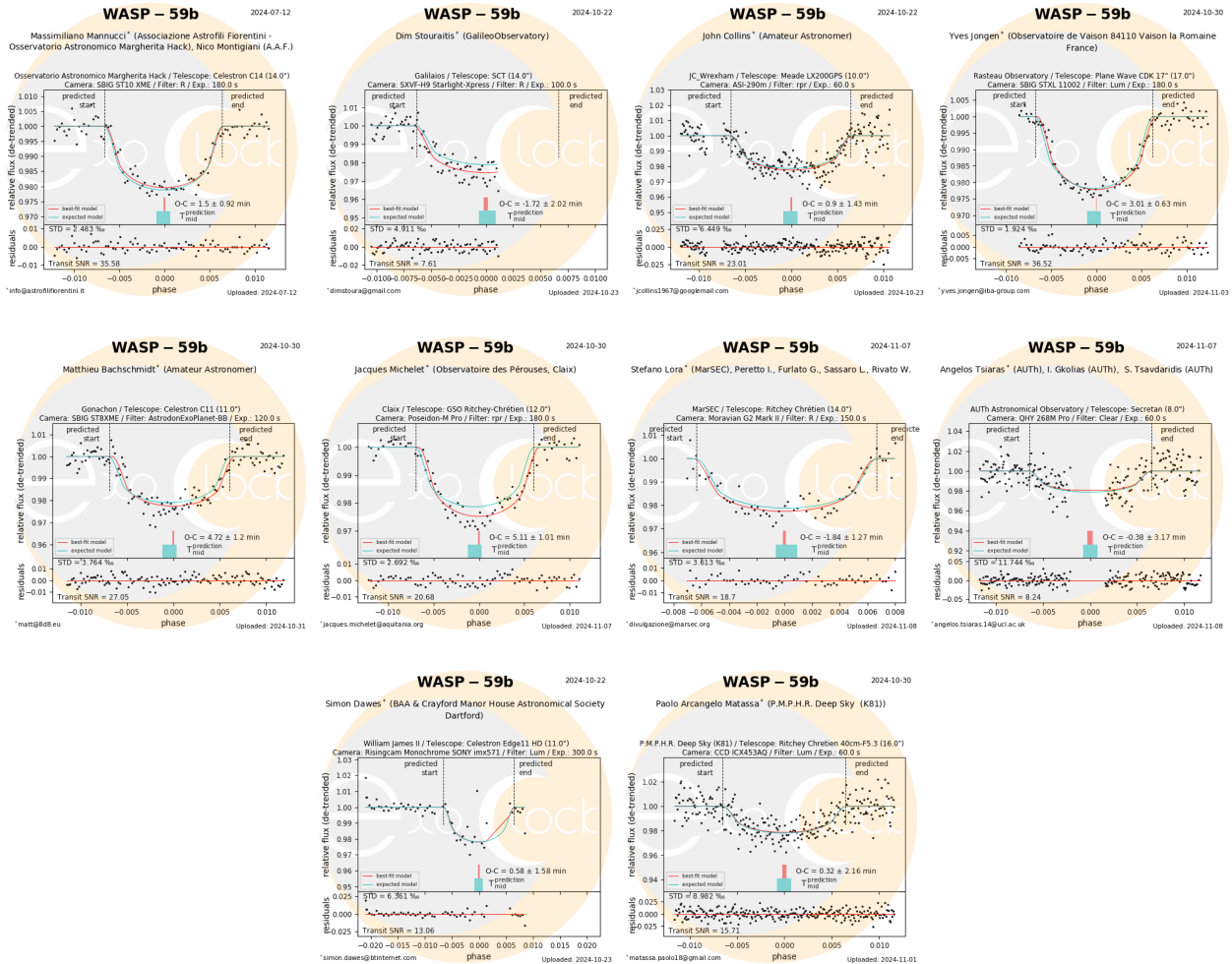
All the guidelines and the material for the activity can be found here:

<https://astroedu.iau.org/en/activities/measuring-an-exoplanet/>

You are encouraged to share this with your communities!

2. Highlighted observation of the month

We would like to thank you all for the observations you contributed during the previous months! We have selected **WASP-59b**, a target that has been flagged with a high priority flag in the scheduler. The target has not been observed since last year and recently it was observed by several members contributing with 10 observations.



Congratulations and thank you for your efforts!

3. “Exoplanet CV of LTT 1445Ab”

These CV articles aim to enrich your background knowledge on the Ariel candidates. The articles feature one exoplanet each month and are written by our literature team. This month we are featuring **LTT 1445Ab**. The article is attached in the next page. Enjoy!

Clear Skies,
the ExoClock team

“CV” of LTT 1445Ab

by Panagiota Batsela (Aristotle University of Thessaloniki, Greece), ExoClock literature team member

One Planet, Three Suns: The Case of LTT 1445 Ab

From the moment astronomers discovered the first exoplanets in the early 1990s, the search for alien worlds has been full of surprises. Among the thousands of planets discovered since, LTT 1445 Ab stands out as an extraordinary find. Orbiting one star in a triple-star system, this Super Earth is just 22.5 light-years away, making it one of the closest known exoplanets to us [1].

Welcome to the exotic LTT 1445 ABC system!

This fascinating planet orbits LTT 1445 A, one of three cool red dwarf stars in the system. Despite its Earth-like size and composition, LTT 1445 Ab is far from habitable: its close orbit, a mere 0.038 AU (about 10% of Mercury’s distance from the Sun), heats its surface to over 150°C [2]. But while it might not be Earth 2.0, this extremely hot world holds the potential to reveal crucial insights about planetary atmospheres and biosignatures.

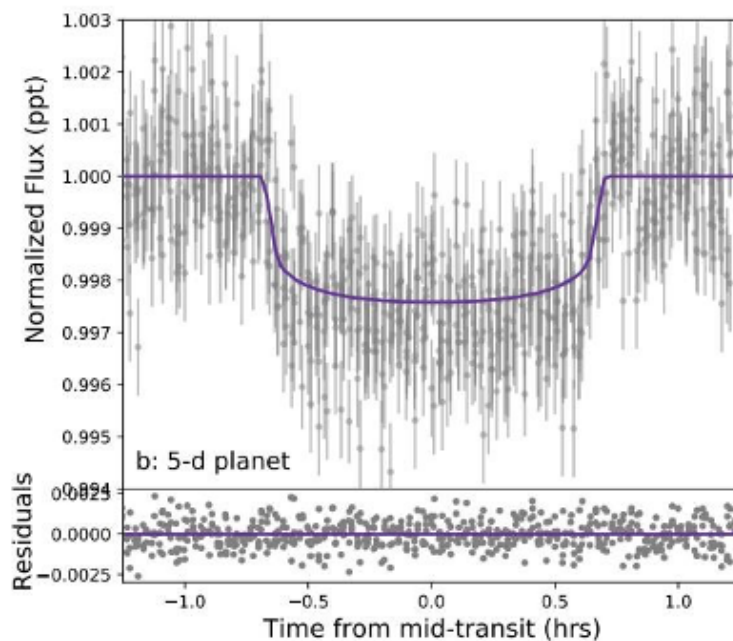


Figure 1: Analysis of LTT 1445 Ab’s transit based on TESS data from 2022 [3].

Atmospheric simulations predict the presence of N₂, H₂, and NH₃ in LTT 1445 Ab’s atmosphere. Did you know? This could qualify it as a Haber World—a planet orbiting an M-type star where ammonia (NH₃) dominates the atmosphere, making it a key target for detecting extraterrestrial life [5].

Picture this: standing on LTT 1445 Ab, you’d witness three red suns in the sky—two of them orbiting each other in a celestial dance while the third, LTT 1445 A, dominates the planetary system. This unique configuration creates a stellar environment unlike anything in our solar system.

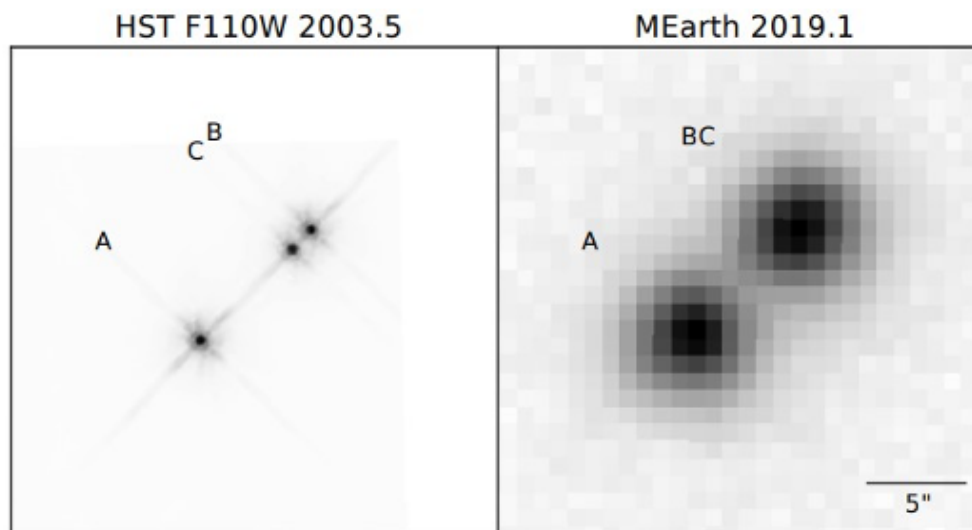


Figure 2: The LTT 1445 ABC system as observed in 2003 (left) and 2019 (right), showing that stars B and C cannot be individually resolved. [2]

The LTT 1445 system didn't stop surprising scientists after the discovery of LTT 1445 Ab. In 2022, astronomers announced LTT 1445 Ac, another rocky world orbiting the same star [3]. Smaller and closer to its sun, this planet has a short orbital period of just 3.2 days. There are also speculations about a potential third sibling planet, LTT 1445 Ad, hinted at by recent data [4].

As the second-closest planetary system with a terrestrial exoplanet, LTT 1445 Ab is an interesting candidate for future space missions like Ariel. In the ExoClock Project, it is highlighted as an ALERT priority target, aiming to refine its transit times—crucial data that will support the success of the Ariel mission (see Figure 3).

In the coming months, there will be opportunities to observe its transit so don't miss the chance to schedule your observation and be part of this exciting scientific endeavour!

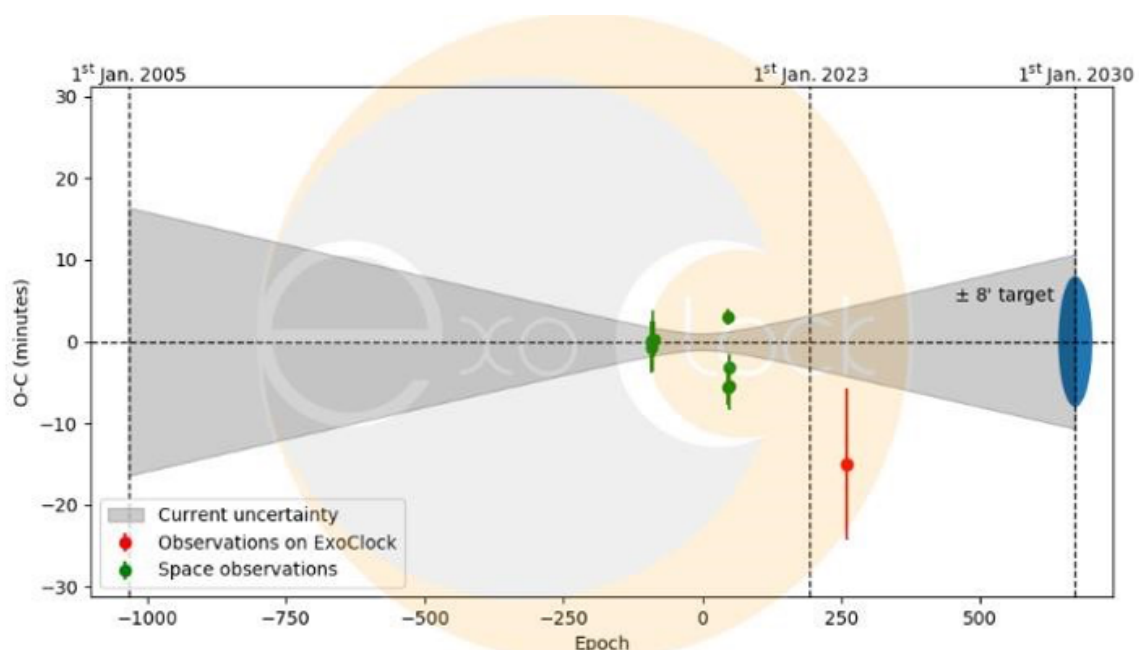


Figure 3: Observations of the LTT 1445Ab transit events in the ExoClock database.

References:

- [1] Luyten, W. J. and Hughes, H. S. 1980, Proper Motion Survey with the Forty-Eight Inch Schmidt Telescope. LV. First Supplement to the NLTT Catalogue (Minneapolis: University of Minnesota)
- [2] Jennifer G. Winters, et al. “Three Red Suns in the Sky: A Transiting, Terrestrial Planet in a Triple M-dwarf System at 6.9 pc” *The Astronomical Journal*, Volume 158, Issue 4, article id. 152, 15pp. (2019)
- [3] Jennifer G. Winters, et al. “A Second Planet Transiting LTT 1445A and a Determination of the Masses of Both Worlds”, *The Astronomical Journal*, Volume 163, Issue 4, id.168, 18pp. (2022)
- [4] B. Lavie, et al., “Planetary system around LTT 1445A unveiled by ESPRESSO: Multiple planets in a triple M-dwarf system”, *A&A*, Volume 673, A69, 29p, May 2023
- [5] Caprice Phillips, et al., “Is LTT 1445 Ab a Hycean World or a Cold Habitable World? An Exploration with Twinkle”, *AAS Division of Planetary Science meeting #54*, id. 403.05. *Bulletin of the American Astronomical Society*, Vol. 54, No. 8 e-id 2022n8i403p05 (2022)