



ExoClock Newsletter

Dear ExoClock participants,

we wish you a Happy and Healthy 2022! Best wishes for a prosperous year full of happiness and clear skies.

First of all, we would like to welcome the new members!

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

www.exoclock.space/users/material

We also organise meetings dedicated to new ExoClock members. These meetings are held on the Friday just after our regular monthly meeting, and they are not recorded. In these meetings, newcomers have the opportunity to ask questions of any level related to the operation of the website, observations of transits, data analysis etc.

Finally, we have a Slack channel for more direct communication and if you want to join, please send a request at exoclockproject@gmail.com.

In this newsletter, we discuss:

1. Announcements

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1.2. Camera testing workshop

1.3. Participation in ETD-ExoClock collaboration

2. Website updates

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2.3 My Schedule

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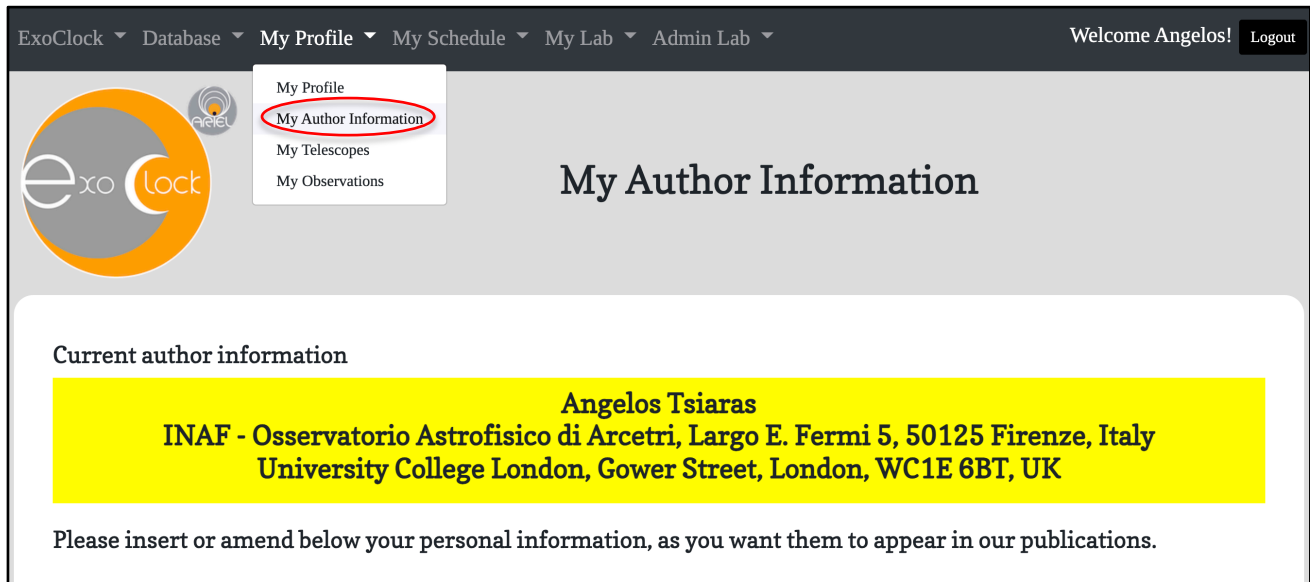
4. Highlighted observations

5. ALERTS

1. Announcements

1.1 Observations for the next paper – Author information needed

As we are preparing the material for the next paper, and we need you to confirm, update, or add your name and affiliation. Please fill in this information in the “my author information” page under the “my profile” tab.



The screenshot shows the ExoClock website interface. At the top, there is a navigation bar with links: ExoClock, Database, My Profile, My Schedule, My Lab, and Admin Lab. On the right, it says 'Welcome Angelos!' and has a 'Logout' button. Below the navigation bar, there is a logo for 'exo clock' and a dropdown menu for 'My Profile' with options: My Profile, My Author Information (circled in red), My Telescopes, and My Observations. The main heading is 'My Author Information'. Below this, there is a section titled 'Current author information' with a yellow background containing the text: 'Angelos Tsiaras', 'INAF - Osservatorio Astrofisico di Arcetri, Largo E. Fermi 5, 50125 Firenze, Italy', and 'University College London, Gower Street, London, WC1E 6BT, UK'. At the bottom of this section, it says: 'Please insert or amend below your personal information, as you want them to appear in our publications.'

1.2 Camera testing workshop

The camera testing workshop was held on the 19th of December and was led by Leon Bewersdorff, an active ExoClock member and university student. We would like to warmly thank Leon for the excellent work, and everyone that joined the discussion. In case you missed it, the recording is available here:

<https://www.exoclock.space/users/material/>

Your opinion matters! It would be very useful for the CMOS working group to receive some feedback after you try some of the techniques that were presented at the workshop. You can email us your questions and comments here: exoclockproject@gmail.com

1.3 Participation in ETD-ExoClock collaboration

In the context of our collaboration with the Exoplanet Transit Database (ETD), we have prepared a dedicated platform for uploading all the past ETD light-curves for the ExoClock targets. All ETD light-curves are filtered out before being uploaded following specific criteria as all ExoClock light-curves. This process is time-consuming and requires knowledge of analysing transit observations.

Together with Filip Walter, who is the responsible from the ETD side, we decided to ask for some help from an ExoClock member into the process of filtering out the ETD light-curves. This is an excellent opportunity to get involved and be part of **the upcoming publication** in case you haven't had any

observations. If you have experience with ETD and you are interested, please send us soon an email here: exoclockproject@gmail.com

2. Website updates

2.1 My telescopes – Multicolour observations

From now on you will be able to upload more than observation for the same telescope during the same night, but with different filters. This is to accommodate multi-colour observations.

If you have registered the same telescope more than once, to submit such observations, please let us know so that we can delete all the duplicated instruments.

A reminder that beyond the use of such observations for specific science cases within the Multicolour WG, we do not advise you to follow the observing strategy of using different filters during the same night. As always, the suggested filter remains the R Cousins.

2.2 My telescopes - Editing

As you may have noticed, it is not possible anymore to change the characteristics of any telescope you have registered, except for the horizon altitude. If you relocate your telescope or replace the camera on it, then you should add a new telescope in your list and deactivate the old one. In this way we will be able to calculate an observing efficiency for each unique system (location + telescope + camera) and estimate more precisely which planets can be observed by each system.

We have noticed several telescopes with obviously wrong location and size, for example a telescope in the middle of the ocean, or another one with 500 inches diameter! Please check the location and size of your telescopes and if they are wrong, please send us the updated numbers through the “Report an issue” portal that you can find at the bottom of every page on the website. Providing a correct location and size for your telescopes is very important both for the scheduler and for the detrending of your observations.

2.3 My Schedule

Two new flags have been introduced to the scheduler:

- **HIGH EFFICIENCY NOTE**

This flag will alert you for planets that you can potential observe with your system but to detect the transit you will need to have an exposure time at least two times longer that the overheads (dead time between exposing). For example, let's assume that you try to observe the planet below, TOI-1601b. You try an initial exposure time of 60 seconds and see that the star is saturated. Then you try an exposure time of 30 seconds, and you see that it is working well. If the overheads of your camera are 15 seconds or less, then you can proceed with the observation. If, however, the overheads are more than 15 seconds then you should not continue with this planet and choose another one from your list.

TOI-1601b Observ. Priority: MEDIUM Total obs. (Recent): 0 (0) O-C minutes: -	02:33:26.7468 +41:00:48.368	10.309	4.49	6.35	HIGH EFFICIENCY NOTE: this planet can only be observed if the exposure time is at least two times longer than the overheads.				
					2021/12/17	2021/12/17	2021/12/17	2021/12/18	2021/12/18
					16:52	17:52	21:03	00:13	01:13
					Alt: 64°	Alt: 75°	Alt: 69°	Alt: 35°	Alt: 25°
					Azi: 77° (E)	Azi: 81° (E)	Azi: 281° (W)	Azi: 297° (NW)	Azi: 304° (NW)
Max counts increase during observation : R:1% V:2% Moon illumination: 98.5% , Moon distance: 32.0°									

- OPTIMAL TARGET NOTE

This flag will appear for telescopes of 14 inches or larger and it will alert you for planets that cannot be observed by telescopes smaller than yours. It would be excellent if you could give priority to these planets as the number of telescopes above 14 inches in the network is limited.

TRAPPIST-1b Observ. Priority: MEDIUM Total obs. (Recent): 0 (0) O-C minutes: -	23:06:29.3684 -05:02:29.031	16.466	10.91	0.61	OPTIMAL TARGET NOTICE: this planet cannot be observed by a smaller telescope				
					2021/12/23	2021/12/23	2021/12/23	2021/12/23	2021/12/23
					15:36	16:36	16:54	17:13	18:13
					Alt: 47°	Alt: 42°	Alt: 40°	Alt: 37°	Alt: 28°
					Azi: 195° (S)	Azi: 215° (SW)	Azi: 220° (SW)	Azi: 225° (SW)	Azi: 239° (SW)
Max counts increase during observation : R:0% V:0% Moon illumination: 82.2% , Moon distance: 155.3°									

3. Observations behind the scenes

In this “Observations behind the scenes” section we discuss the impact of low observing efficiency. As observing efficiency, we define the ratio of the exposure time over the total observing time. For example, if you observe a star with an exposure time of 60 seconds and with overheads (dead time between exposures) of 15 seconds the observing efficiency is:

$$\frac{60 \text{ s}}{60 + 15 \text{ s}} = 0.8 \rightarrow \mathbf{80\%}$$

When the scheduler suggests you observe a transit, it assumes that you will be observing for 120 minutes plus the transit duration, AND with an observing efficiency of at least 50%. Only if you follow this pattern, you will obtain a light curve with the expected quality.

For example, the scheduler suggests you observe Qatar-1b (transit duration = 100 minutes). If you observe for 220 minutes with an exposure time of 30 seconds and with overheads of 30 seconds (observing efficiency = 50%) your observation will be of high quality, and we will most probably accept it. If you, instead, observe for 220 minutes with an exposure time of 30 seconds but with overheads of 60 seconds (observing efficiency = 33%) your observation may not be of sufficient quality to detect the transit and we may have to reject it. Note, that the two observations in the example above will have the same scatter (STD) but the second will have less data points in total, which will lead to a worse fitting result.

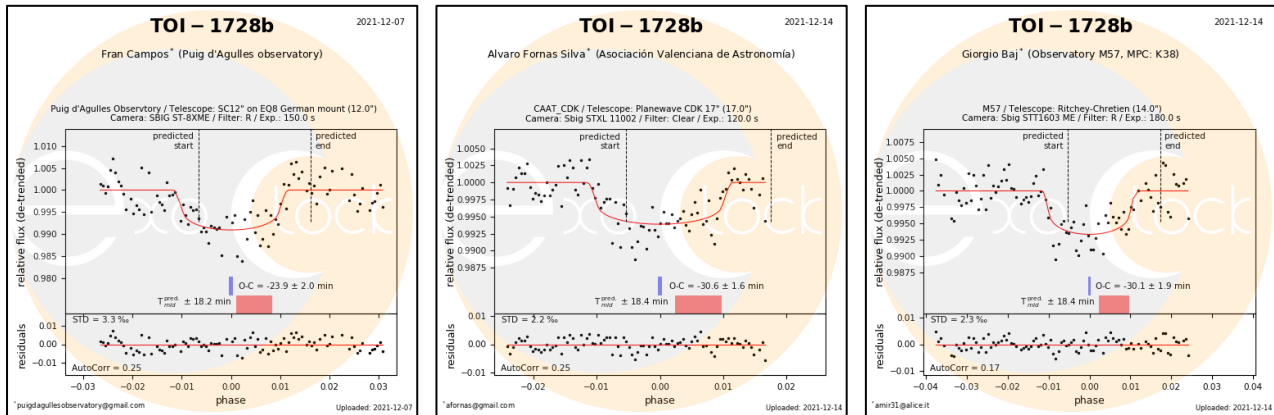
To conclude, when you set up your observation, first check your overheads. If the star is too bright and you need to reduce the exposure time to a value that is lower than the overheads then either try to reduce the overheads by downloading only a subframe of your image (be careful to include comparison stars) or choose a different transit to observe that night!

4. Highlighted observations

Last month – December- we received many observations which we can highlight, thank you everyone! We have selected TOI-1728b, for which a shift of ~30 minutes(!) was initially identified by Fran Campos on the 7th of December. This drift was confirmed both by five more observations during December by Robert Roth, Alvaro Fornas Silva, Giorgio Baj, Yves Jongen and Manfred Raetz.

Below you can see some of these light-curves.

Congratulations for your efforts!



5. ALERTS

Thank you all for observing the alert targets! Please check your personalised alert schedule at:

www.exoclock.space/schedule/alerts

for the **ALERT** planets and if you get a clear sky and a long-enough night, you can try observing them! The following targets are in the current **alert system**:

- HAT-P-70b
- KELT-6b
- HATS-41b
- HAT-P-35b
- TOI-163b
- KELT-2Ab
- EPIC246851721b

We remind you that many targets were not in the alert list, before an unexpected shift was identified by you, the ExoClock participants. This highlights the importance of observing targets that are also of low and medium priorities.

Clear Skies,
the ExoClock team