

Dear all,

Cc Plannocult and IOTA (USA, Canada, Europe)

There is a very favorable forthcoming stellar occultation by Uranus' satellite Titania on 2023 **November 21** around 5h 24m (UTC) by a relatively bright $R = 11.75$ star. The OW Cloud prediction is given below:

<https://cloud.occultwatcher.net/event/1054-P7M03-45628-649108-T00841-1/Horizons;GaiaEDR3>

The path indicates that all USA and Canadian participants in the 2020 **September 21** stellar occultation by Umbriel are again well placed for observing this new event. Indeed, many of you that participated in the Umbriel observations and authored our related MNRAS paper (<https://academic.oup.com/mnras/article/526/4/6193/7313621>) are already planning to observe this Titania occultation.

Here, I specially invite European observers too, to join us in this huge international campaign.

I emphasize the importance of observing this event, following the same scientific reasoning of our recently published Umbriel's MNRAS paper. A plus for the case of Titania is that two stellar occultations were already observed in the early 2000's (see Widemman et al. 2009, Icarus) next to the Uranus equinox, and now we can add to their analysis by probing the northern hemisphere with dozens of chords. Therefore, we could probe the south (Voyager II), equator (Widmann et al.) and north limbs (this occultation) of Titania.

Adding knowledge about this moon is very important, as "(...) spacecraft exploration of Uranus and its large moons is the highest-priority outer solar system mission recommendation of the 2023–2032 Planetary Science and Astrobiology Decadal Survey (National Academies of Sciences et al. 2022)." - see e.g. Beddingfield et al. 2023, The Planetary Science Journal, 4,211).

Due to the fine star's brightness, we can also try to get better time resolution (shorter expositions) in order to probe for putative local atmospheres - see the atmosphere analysis in our MNRAS paper. Exposure times of 0.1s or even less should be tried if possible for this purpose, if it does not sacrifice the S/N too much. No filters are required for the observations.

In summary, I ask all observers who participated in the Umbriel campaign to observe this event too.

I also urge potential European observers to join in too (see prediction path above). Please, contact other colleagues to collaborate with us too.

Most important, I kindly ask all American, Canadian and European potential observers to register now in our Occultation Portal:

<https://occultation.tug.tubitak.gov.tr/>

Once you register to the Portal and log in, you can search for the Titania event on "Predictions", and register for this event, indicating that you are planning to observe it. We have so far 11 registered observers planning to observe the occultation. After observing the event, please upload your observations to the Occultation Portal as soon as possible, so that our team can start working on the data.

I will alert you again about this very promising occultation near the event date.

Many thanks in advance, sincerely

Marcelo Assafin

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IAU Division A - Fundamental Astronomy
Steering Committee Member

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But he wrote more, in response to questions from Richard Nolthenius:

Hi, Rick

Titania has no global atmosphere as Pluto. It may have quite thin, low density local atmospheres (as we discussed in our paper, in agreement with previous measurements made by Widemann et al., 2009).

Therefore, we do not expect a gradual decrease of flux like for the Pluto occultations. We see more sharp drops. However, to detect "non-vertical" drops (very low density local atmospheres), we must have a good time resolution, i.e. small exposure times equal to or smaller than say 0.1s with at least reasonable S/N.

Best regards,

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Em qua., 15 de nov. de 2023 às 05:26, rick nolthenius <rickn27@yahoo.com> escreveu:
Hello Marcelo,

I've registered for this event; we've got permission to use the 36" Cass at MIRA in the Big Sur Mountains (Monterey Institute for Research in Astronomy). I'm experimenting with a new videocam for possible use at MIRA. We will be sure to get dark video and also flat field video in twilight.

I note that for the Pluto occultation of Aug 14, 2018, we had fully 25 seconds of gradual fading with spike variations due to layers in Pluto's atmosphere. And that star was only 13.0 magnitude and the telescope was the 30" reflector at Fremont Peak. I would expect if Titania has an atmosphere of similar density it should be visible as a gradual fade over many seconds. Was there any detection of atmosphere from the prior 2 Titania occultations? See our light curves for Pluto below

<https://www.dr-ricknolthenius.com/events/20180815Pluto/index.html>

Richard Nolthenius
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