

**Program - Veonis Vespera  
telescope – Mike Fiest**

**Volume 28, No.10  
February 2023**

**Greg Smith – editor**

**Meeting: Wednesday 7pm  
February 15, 2023  
ZOOM/R. A. Long Rm 130**

For me personally, Comet ZTF was a bust. I could not find it in my 10X50 binoculars, just too much moonlight and light pollution from here in downtown Longview. I am glad that several of you were able to get a glance at it, I hope one of you were able to get a photograph of it.

Once again the comet of the year did not live up to the hype of naked eye visibility. Sure, if you were way out in the hinterlands of Southwest Washington you may have been able to see it. Mike, I hope you at least got some views of it with those cool photo scopes of yours. Did you see it with the one you are going to talk about this Wednesday?

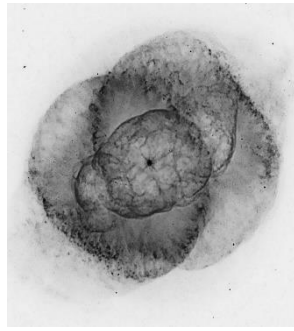
Oh well, we will just have to wait for the next one to come by and get us all excited. I see in the magazines the hype for the 2024 eclipse is starting. I did notice that they are hedging their bets by saying that when the eclipse is, is not the best time of year for sunny cloudless days in the eastern part of the country where the eclipse will be tracking. Not like August was for the

northwest. It was prime season for clear days even at the coast.

Enough dwelling on the past, what's ahead?

It looks like Elon Musk is getting ready for a very dramatic launch of his big rocket this spring, soaring with all of its 30+ engines. I believe he is going to try and send astronauts to go around the Moon and then come back with some kind of an exceedingly dramatic landing. In my opinion he should send a probe to go and find his car that is in orbit around the sun and report back on what condition his Tesla is in after over a year in orbit. It might give some really interesting data on how things survive in the habitable region of space with no protection at all. I know we have probes out there without a protective shield, but they were designed to be out there. Just a regular car with no protection is another story. Is the paint blistered? Are the leather seats still intact? So much new information to be gained from his ego trip.

**Every Night is a Starry Night  
Every Day is a Star Filled Day**



Not where  
it is  
supposed to  
be.



## ASTRONOMERS DISCOVER RING AROUND DISTANT DWARF PLANET

There's a strangely large-diameter ring around the outer solar system world Quaoar.

BY: JEFF HECHT FEBRUARY 8, 2023

The distant dwarf planet 500000 Quaoar appears to have a ring that spans far beyond where it ought to be stable. "That is not where it was supposed to be," says Bruno Morgado (Federal University of Rio de Janeiro, Brazil), lead author of a team of 59 astronomers who report the discovery in *Nature*.

French astronomer Edouard Roche defined the concept of the *Roche limit* in 1848, calculating where a planet's tidal forces would exceed the gravitational force holding a moon together. Inside that region, the stronger gravitational force of the planet overpowers the moon's gravity and that tidal pull eventually tears the moon apart. Only outside that limit can small objects, dust, and debris coalesce under their own gravity to form a moon. With the ring's discovery, the Roche limit may need a rethink.

Although the limit is somewhat of an approximation, it has served as a good rule of thumb in the solar system. Saturn's main rings, as well as those around the other giant planets, lie inside the planets' Roche limits. The same is true of the dwarf planet 136108 Haumea. The smallest object known to have rings is 10199 Chariklo, and these also lie within its Roche limit. But the uneven ring around Quaoar breaks the rule, lying beyond the dwarf planet's Roche limit.

At 1,110 km (690 miles) in diameter Quaoar is one of the largest objects known in the outer solar system. Its single moon, named Weywot, spans about 160 km and was discovered in Hubble images in 2007. But the first signs of material around Quaoar didn't come until 2018; even then, evidence was insufficient to call it a ring, says Morgado. He began studying Quaoar in 2020 with the European Space Agency's CHEOPS space telescope, originally designed to find and characterize exoplanets. Rather than looking for exoplanet transits, Morgado used CHEOPS to observe *stellar occultations*, when Quaoar passed in front of distant stars and momentarily blocked their light.

Now Morgado has extended his work, working with others to observe Quaoar's stellar occultations using other telescopes. The team first predicted a few occultations and recorded them. Then, after those

observations hinted at a ring, the researchers went back through previous occultation records. “We saw the ring in nine different regions, from observations taken between 2018 and 2021,” Morgado explains.

In *Nature*, the team reports the presence of a ring 4,100 kilometers from the center of Quaoar, far beyond its classical Roche limit of 1,780 km. Morgado says the ring is dense and irregular. “It has a very thin region about 5 km wide and also a large region about 300 km wide, depending on which part of the ring was probed,” he notes. If the material could all be collected into a single moon, it would be about 10 km in diameter, less than a tenth of Weywot’s size.

A few thin, light rings exist beyond the Roche limit elsewhere in the solar system — like the tenuous rings beyond Saturn's F ring — but nothing so massive as the ring around Quaoar. “We were very surprised by the existence of such a ring,” says Morgado. A ring at this distance shouldn’t be stable; it ought to either collapse together or drift apart over time.

Though it might have formed after a recent collision in the Quaoar system, that seems unlikely because such a ring should only last a few decades. Other hypotheses Morgado and colleagues pondered include orbital resonances with Quaoar and its moon Weywot, or unusual interactions involving ring particles. In the end, they conclude it might be time to rethink the classical Roche limit.

“The finding of possible ring material around another small body in the solar system is intriguing,” says Amanda Sickafoose (Planetary Science Institute), though she notes that the team didn’t demonstrate a full ring system. The scale and dynamics of such smaller bodies, “are considerably different . . . to those of the giant planets,” she adds, “calling into question our basic understanding of how ring systems form and evolve.”

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## ☞ February 2023 Meeting ☞

DATE: February 15, 2023

TIME: 7:00pm

PLACE: Hybrid in person / Zoom - originating from R, A. Long H. S. Rm 130

PROGRAM Veonis Vespera telescope. – Mike Fiest and his new telescope

### Moon Phases

Full: Feb. 16, Wed.     3<sup>rd</sup> Qtr.: Feb. 23, Wed.     New: Mar.2, Wed.     1<sup>st</sup> Qtr.: Mar 10, Thurs.

End of twilight - when the stars start to come out.

Wed, Feb 15<sup>th</sup> 6:13pm    Mon. Feb28<sup>th</sup> 6:26pm    Fri. Mar 10<sup>th</sup> 6:40pm    Wed Mar 15 7:46pm

**The Star Report** is posted on the clubs website: 1. It is listed in the blog portion of the website.

### **Minutes of the January FOG Meeting**

We had 10 members and guests join us online during the last meeting and 7 join us in person. So a pretty good attendance. Mark Thorson shared about his visit to the U.S space and Rocket Center in Huntsville, Alabama just an hour from Atlanta. He shared photos of the impressive full size Saturn Rockets that are on display in the Museum. When people are standing under the rocket you can get a sense of the scale of how huge these are.

We also discussed the Solstice Walk and how next time it will start at 4:30pm.

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