

# Carpe Noctem



The News of Central Texas Astronomical Society

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## Hot and Streaming Stars



## Presidents Letter – June 2020

The heat is back but so are the stars. I hope everyone is able to stay safe and cool as we get back out under the night sky. By the time you read this, we will have had our Member Star Party in June at the observing field. I'll remind everyone that field remains available at all times to members for observing. We are also going to try some more live streaming star gazing using the Meyer Observatory. The good news is the telescope is in great shape and operating better than ever before. We have been doing science remotely for about a month now. Support TESS and the University of Delaware. We hope to begin operator training later this month in small groups.

While astronomy can be a solo event, we also like to share our eyepieces and get together socially. This is of course difficult in these times, and we are still discussing how we might start our public Open Houses again. I get a lot of calls from the public. However, we want to try and have our quarterly Business Meeting in July in conjunction with the Member Star Party and Star-B-Q. Hopefully, we can come up with a process that is safe and keeps everyone comfortable.

In the meantime, I hope you are getting out and enjoying “the Stars at Night ... Big and Bright!” Clear Skies!

- Dick Campbell  
President, CTAS

## Observatory training

If you are interested in receiving training on the Meyer Observatory 24-inch telescope, join one of our ongoing training classes!

To sign up for training, please send Dick Campbell ([Dick\\_Campbell@baylor.edu](mailto:Dick_Campbell@baylor.edu)) this information:

1. Contact info (email, cell phone number with text capability)
2. Previous experience with PJMO, if any (not required)
3. Availability (weekdays only MTWR, weekends only FSS, or flexible). All sessions will be conducted in the evening.

If you are inexperienced, please don't feel hesitant to sign up. The system is relatively easy to operate, and it will be a great learning experience for you. Responses will be accepted continually, and scheduling will be based on the availability of the responders.

## M51 Image on the Cover

Congratulations to Aubrey Brickhouse for the beautiful image of M51, that he produced using the 24-inch Meyer telescope and our Miller camera last week.

## Thor's Helmet

Thor's Helmet is an emission nebula in the constellation Canis Major. The nebula is approximately 12K light years away and 30 light-years in size. The central star is the Wolf-Rayet star. It is similar in nature to the Bubble Nebula.



-Aubrey Brickhouse

**Comet ATLAS Y4** is still getting brighter, and now the tail is beginning to grow as it dives towards the Sun at over 70,000 mph. I got out on Tuesday night, and could tell right off that the tail was more prominent. Despite a glaring Moon and some high clouds in the area, I was able to get a few shots of the comet before the clouds won out.

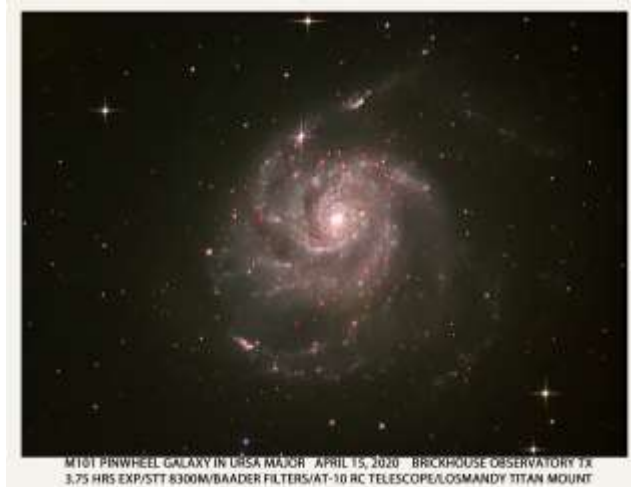
Here's a combination of 18 X 120 seconds stacked on the comet. Estimates show the tail at about 1.2 degrees. It should continue to grow, and the comet could be 5th or 6th mag. by mid month.



-Johnny Barton

## Pinwheel Galaxy

M101 Pinwheel Galaxy is a Spiral "face on Galaxy" about 21 MLY from our earth and it is located in Ursa Major (in the tail of the Bear). It is said to be about 70% larger than our galaxy, the Milky Way. There is a lot of star creation in the arms, where you can see the red star forming areas. It was discovered just in time to make the Messier List in 1791.



## Upcoming CTAS Events\*\*\*

All events are shown on the Calendar of Events on our [website](#). In the event of discrepancies, the web Calendar of Events is the official schedule, as changes may occur throughout the year.

New Moon	Member Star Party	Meetings	Open House
6/21/20	6/13/20	6/16/20*	6/20/20
7/20/20	7/25/20	7/25/20**	7/18/20
8/18/20	8/22/20	8/18/20*	8/15/20
9/17/20	9/19/20	9/15/20*	9/19/20

\*Board Meeting

\*\*Star-B-Que and General Meeting – we will have the General Meeting and star party, but we may not be able to serve food. Bring a lawn chair. If cloudy, we will meet via Zoom.

\*\*\* Please check the website Calendar of Events for changes due to closures during the Pandemic.

## New Members

Dick Gentry  
James G. Hensley  
Edgardo Marzan  
Sarah Marzan  
Maria Mendoza  
Judith Provencal  
Scott Stevens

We welcome you aboard the Starship CTAS!

## It's Back! It's Better Than Ever!

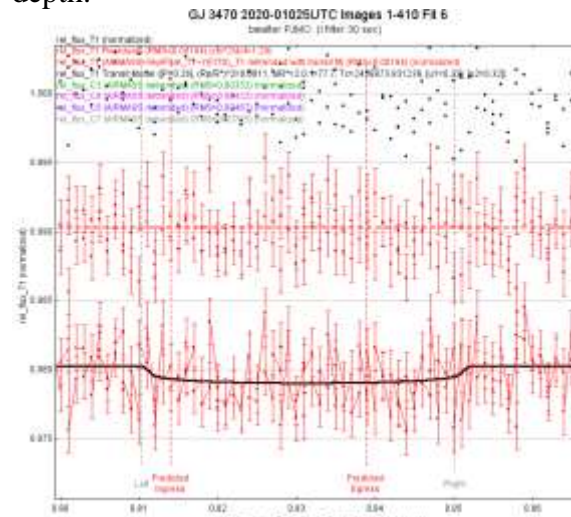


And it's been working hard!

The PJMO telescope is now fully back in operation. During late December through March, our telescope was back on the sky and capable of doing science but there were still some significant problems. The biggest of those were some problems with pointing, tracking, and guiding, which significantly impacted the telescope's performance. Guiding had never worked properly, and that was one of the reasons for undertaking the telescope upgrade project. Regardless of the problems, PJMO participated in the Habitable

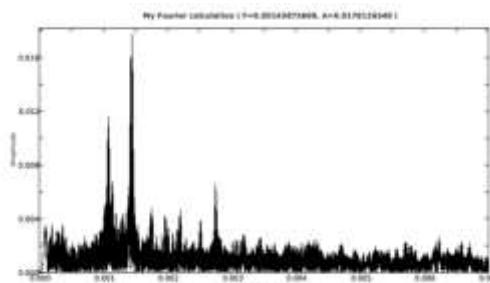
Exoplanet Project search for an exoplanet in the habitable zone around the nearby red dwarf star GJ3470.

The weather was uncooperative but on the few good night we had, the telescope captured some light curves with transit detection capability better than I thought possible for a 24 inch telescope. Here is a light curve it captured that clearly shows a potential transit event with less than 0.1% transit depth.



Our new "Miller" Pixis camera from Princeton Instruments. The telescope was taking remarkably high quality images regardless of the remaining operational problems.

Dean Chandler, with assistance from other club members, continued working hard with A.C.E. to



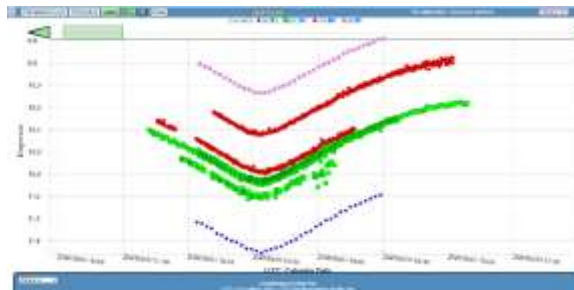
resolve problems. In late April, all major operational problems appeared to be resolved. The guiding was working extremely well. This improvement came just in time for us to respond to a request from Judi Provencal, Director of the Delaware Asteroseismic Research Center

(DARC), who is the coordinator of the Whole Earth Telescope Network. She asked us to observe a pulsating white dwarf (WD) that was previously unobserved by WET. Due to the coronavirus pandemic, The University of Delaware was closed, including its Mt. Cuba observatory. With our professional equipment, we were her only chance of getting data on this target. We obtained 10 nights of data between April 21<sup>st</sup> and May 6<sup>th</sup>, totaling more than 2,600 target images. Judi was delighted with the data, and sent us the preliminary spectrum above.

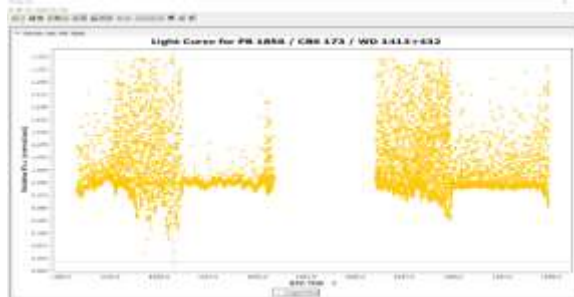
This target exhibits two fundamental frequencies near 1 milli-Hz, plus several harmonics and cross harmonics (sums and differences of harmonics of different fundamental frequencies). However, it also has the unusual feature of an additional fundamental at a substantially higher frequency, slightly below 3 milli-Hz. Our target turned out to be an interesting and unusual pulsating WD.

The day after completing the last observations of Judi's target WD, CTAS received an Alert Notice that the TESS scientists urgently needed observations that night of TYC 2483-160-1. This is an EA (Algol like) eclipsing binary star system. Normally that would not be of interest to TESS researchers, but this binary system was a strong candidate to be the second discovery of a binary system with a "Tatooine like" circumbinary transiting exoplanet (orbiting both stars).

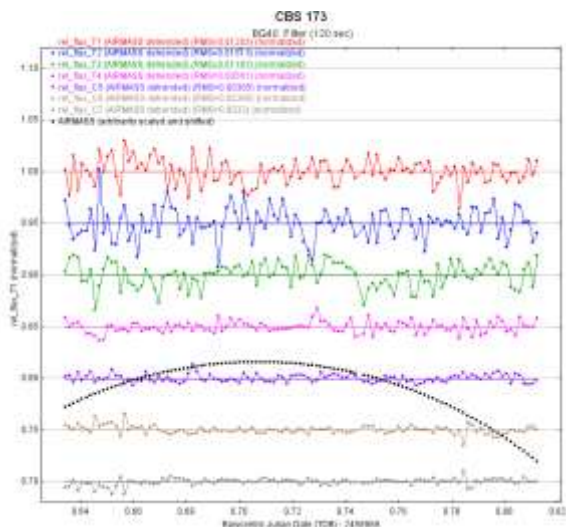
The TESS researchers needed accurate ground observations of the primary eclipse of the star system during the satellite's observations of the system to confirm the planet's existence. There was only one chance to capture the primary eclipse during the time TESS was observing this field and PJMO was one of only 6 sets of observations that captured the minima. Only PJMO and one other observer captured essentially the entire egress. PJMO observations are the upper red curve in the image below.



Immediately after submitting the eclipse data Judi contacted us again. TESS had captured data that was presumably for a new pulsating WD discovery, but the TESS light curve looked nothing like a pulsating white dwarf. It looked more like a flare star.

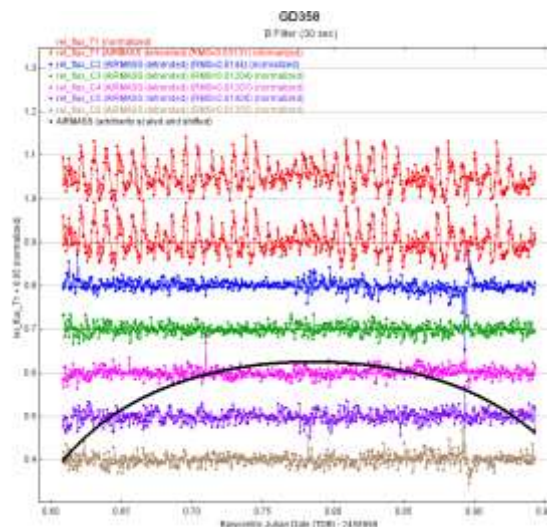


TESS cameras have extremely large pixels covering about 21x21 arcsec per pixel and TESS photometry apertures are effectively larger than 1 arcminute radius. Therefore, it was likely that the light curve of the target was contaminated by other objects. It was possible that the narrow dark fluctuating band of variability was the real variability of the target or it could turn out that the TESS data was simply bad data. Mt Cuba and other WET locations were still shut down or unavailable. Once again, it was up to PJMO! The weather cooperated and we got three nights of data in a row. All the data looked like light curve below.



The T1 curve is the white dwarf light curve and it showed no obvious variability compared to other nearby non-variable stars of similar brightness. The TESS data seemed to have problems.

Finally, during the last week of May, Tess was scheduled to take images of the field containing an old friend, the extremely active pulsating WD GD358, and DARC needed ground observations to compare with TESS. The light curve of this star has been observed to contain 124 different frequencies simultaneously. Even more interesting frequencies in the light curve have been seen disappearing and reappearing from time to time. Weather was not nearly as cooperative at the end of May, and it took 10 days to get decent data on 3 different nights. The data was high quality and we could easily see that GD358 was its usual extremely complicated self from our light curves like the plots labeled T1 below.



Once again Judy was extremely pleased with the data and confident that she had everything she needed to compare with the TESS light curves.

The rejuvenated PJMO telescope is working better than ever, and unlike many other observatories, it has been working hard during the Pandemic.

I encourage any of you who are interested in using the PJMO telescope to complete the training course. The observatory is a joy to use, provides excellent results, and has observing time available.

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