Event Horizon

Volume 25, Number 10
October 2018

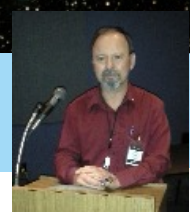
From The Editor

This edition of the E.H. features 2 more excellent astro-images and one more fascinating article by H.A.A. member Peter Wolsley.

And Mike Jefferson's astrophysics group report is back.

Enjoy!

Bob Christmas,
Editor
editor 'AT'
amateurastronomy.org



Chair's Report by Bernie Venasse

Summer has passed and autumn is quickly upon us.

Our September Outreach event was a success. A dozen members set up scopes and educated the public about our hobby. Many ooh's and ah's, wows and awesomes, were heard throughout the evening. A great job by everyone.

Our October 12th, our guest speaker will be *Paul Delaney*. Paul has been a guest of the club several times and his talks are always informative and educational. This time around, Paul will be speaking about variable stars and binary star systems.

Our Annual General Meeting takes place at the October meeting. It's at this meeting that we look after most of the club's business for the year (the delivery of the clubs financial report and the election of the club's council for the upcoming year).

We have been lucky to have some very good people looking after the club's interests this year, and I feel privileged to have been associated with them. The club cannot

(Continued on page 2)

IN THIS ISSUE:

Chair's Report (continued)

operate without people willing to get involved with the day to day operations of club's business. Even though we do have a great group of people now, we are always looking for new council members. If you think you would like to get more involved in the club, please get in touch with a Council member and we can talk about what you would like to do.

H.A.A.'s Loaner Scope Program

We at the HAA are proud of our Loaner Scope Program.

If you don't have a telescope of your own and want to make use of one for a month or so, you can borrow one of our fine loaner scopes.

Please contact *Jim Wamsley*, at:

905-627-4323

…and we'll gladly get one signed out for you.

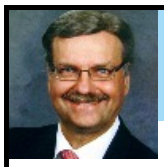
HAA Helps Hamilton

To support our community, we collect non-perishable food items and cash for local food banks at our general meetings. Please bring a non-perishable food item to the meeting or a donation of cash and help us help others.

Our donations go to Hamilton Food Share, which delivers them to various food banks around the Hamilton area. If you would like to help or have any questions about this initiative, please contact the H.A.A.

Masthead Photo: *NGC 7380, the (other) Pacman Nebula, by Peter Wolsley.*

Taken September 16, 2018 with his Nikon D5300-Ha-modified DSLR through his Skywatcher BK80ED 80mm refractor and 0.85 flattener/reducer, at ISO 800, for 22 four-minute exposures (88 minutes total).



The Sky For October 2018 by Steve Germann

Meteors

At Last... October. My chance to mention my favourite meteor shower.

This Month, you can see the *Orionids Meteor Shower*, which peaks on October 21st.

Those meteors are usually large and bright, if not too frequent. And they can be seen for 3 days before and after, so you are pretty sure to get a clear night and see one if you look.

You will be seeing a fragment of Halley's Comet which has been circling the sun in the same orbit as the main comet nucleus, for thousands of years. I think it counts as seeing the comet. The Orionids are exceptionally bright, and the second-fastest meteors of the year, at 67 km/s.

The glow you see is not the hot meteor itself, but the air in front of it, compressed to very high pressures and pushed ahead, glowing brightly. It being right in front of the fragment, the hot air roasts the fragment, over the short time it is decelerating, often resulting in a burst of intense light as the meteor shatters and each piece has a chance to push some air. The brightness can increase by a factor of a hundred for that short time.

A 1 gram meteor contains 2.25 megajoules of energy. That is half a kilowatt hour. It turns about 10 percent of this into light, in 1 second, glowing like a 1 megawatt light bulb, 100 km away. The Human eye is pretty sensitive, but despite fables to the contrary, we can only see a candle in darkness about 2.5 km away. At that distance it will resemble a 6th magnitude star.

Here's an informative article on that topic:

https://www.technologyreview.com/s/539826/how-far-can-the-human-eye-see-a-candle-flame/

The commenters pick issues, but don't actually understand, because 6th magnitude is a real number, and we know that that is. Candles are dim, compared to the power available, which is 80 watts of burning wax. You get about 40 milliwatts of light. So 200 kW of light from a meteor 100 km away will be 5000 times brighter than magnitude 6, or magnitude -3.

And that is just a one gram meteor.

So....

where to look? Towards Orion, which rises a bit before Midnight in October.

If staying up late is not for you, then consider early in the morning, when Orion will still be nearly due south, this month.

Even UK online articles try to trumpet this shower, but can you spot some of the errors in their article?

https://www.independent.co.uk/news/science/orionid-meteor-shower-2018-when-where-how-to-see-best-dates-time-a8563766.html

or a better article:

http://earthsky.org/?p=27937

(Continued on page 4)

The Sky For October 2018 (continued)

The key thing is, the Orionids are so bright, they will show up in a 30 second time exposure of the sky.

The *Draconid* meteor shower is also peaking this month, and has, in 1933 and 1946 produced meteor storms. No storm is expected this year, and seeing even one of these meteors will be a challenge, as the radiant, though very high in the sky, peaks about 5 PM local time on October 7th. At least there is no Moon to interfere. If you see one of these, you will be impressed by how slow moving it is.

Here's a link to a page putting the Draconids in the best possible light, so to speak.

http://earthsky.org/?p=180611

Comets

The comets of September are leaving us and are now strictly telescope targets, with *21P Giacobini-Zinner* being the brightest at 8th magnitude and not far from Orion.

Comet *64P Swift-Gehrels* is moving very slowly towards Andromeda, and at 11th magnitude makes a very challenging telescopic target, but an easy photographic target.

Use heavens-above.com to get finder charts for comets on the day you plan to seek them.

The Planets

Venus will be 6 degrees south of the sun at Inferior Conjunction (along the line between us and the Sun), on the 26th, and can even be seen in the daytime but only with specialized equipment. That close to the Sun, it's dangerous to use a telescope.

Mars while still prominent at night and unmistakably bright and reddish (if not red, then at least orange) is something you can point to in the sky and tell a friend about it. Mars will fade this month back to more normal brightness. The Moon will be near Mars on October 18th.

Saturn is still up and a treat to see, even in a small telescope.

But this is the month for *Uranus*, which is at opposition, and moving northward on the ecliptic. Uranus has not been this far north since 1963. At magnitude 5.7 it can technically be seen by a young person without binoculars from a dark place such as Binbrook Conservation Area. With binoculars it will be easy to find, and easier still (with Binoculars) on the 24th when the Full Moon will be just south of Uranus.

October is Handbook season too.

This is your last chance to reserve an Observer's Handbook before the November meeting.

I plan to buy 30 books, and more only if more people reserve a book. To reserve in October, you will need to put down your $20 in advance. Or you can take your chances with the limited number that will be available in November, first come first served.

This is an excellent book, and features many troves of astronomical knowledge for the coming year.

I expect we will be able to distribute the books at the November Meeting.

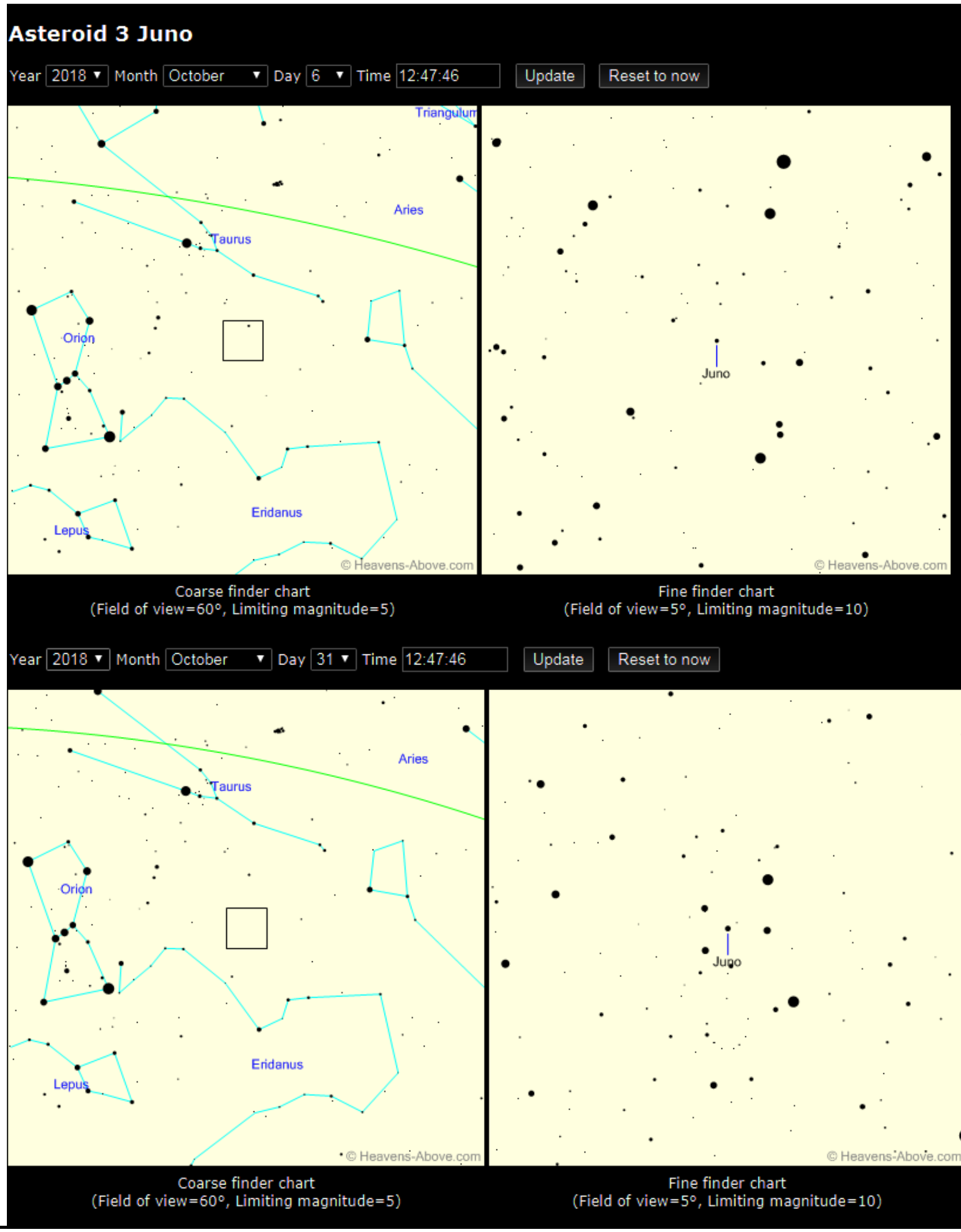
Speaking of the Observer's Handbook, the Month of October brings a few notables...*(Continued on page 5)*

The Sky For October 2018 (continued)

Asteroids

3 Juno is still your best bet for seeing an Asteroid this month. At magnitude 8.2 it is an easy binocular target in Orion. Here at top is a chart for October 6th.

And by October 31st (shown below) it will have moved slightly southeast. *(Continued on page 6)*



The Sky For October 2018 (continued)

Sky Phenomena

The *Zodiacal Light* is again prominent in Moonless morning skies, this month. The recommended times to seek it are October 13-27.

Moonrise

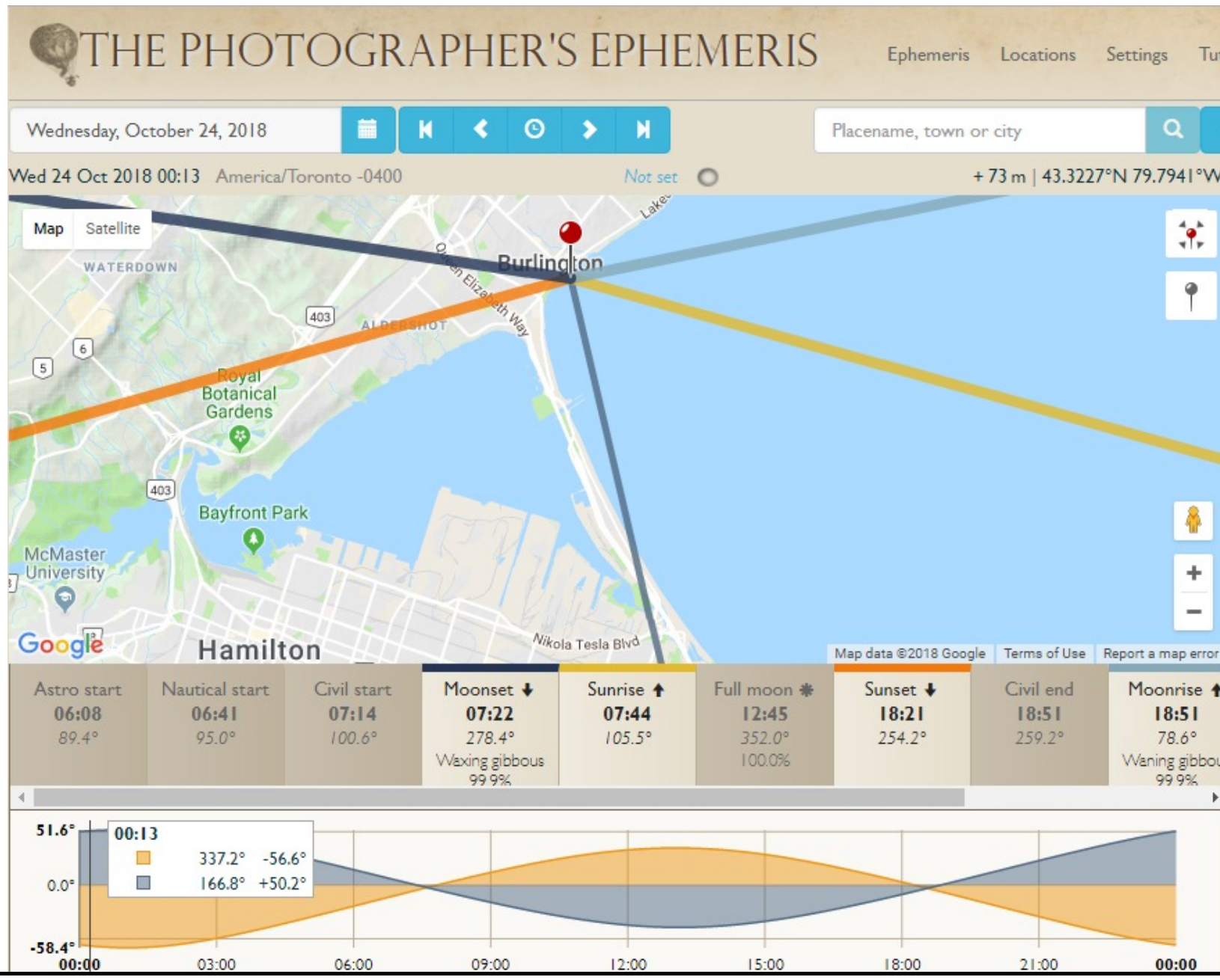
September's Full Moon rose on a cloudy drizzly day. Pity. We can try again in October.

The *Full Moon* will rise from an azimuth of 78.6 degrees at 18:51 PM on October 24th. Once again, parking is free after 6 PM at Spencer Smith Park in Burlington, and the Pier there makes a good vantage point. Below is a plot of the Moon and Sun rise and set directions from Burlington for October 24th from the Photographer's Ephemeris website.

Messier Objects

With Orion now rising at more civilized hours (11 PM), you should take the chance to re-acquaint yourself with *M42*. I recommend using your highest power eyepiece to see how many stars you can observe in the *trapezium*, the tight knot of stars shining in the center of the nebula.

I wish you clear skies and hope you will come to our October meeting.



Hamilton Amateur Astronomers Astrophysics Group by Mike Jefferson

September 21, 2018

The meeting began at 7:30 at Doug Black's home on Markland Street in Hamilton, ON. Our topic was ”Debris Disks”, both resolved and unresolved. The research and work on this subject were presented by Doug Currie. He titled it ”Debris Disks and The Evolution of Planetary Systems”. Members present were Doug Black, Doug Currie, Steve Germann, Mike Jefferson, Aidan King, Ian Rabenda and Gary Sutton.

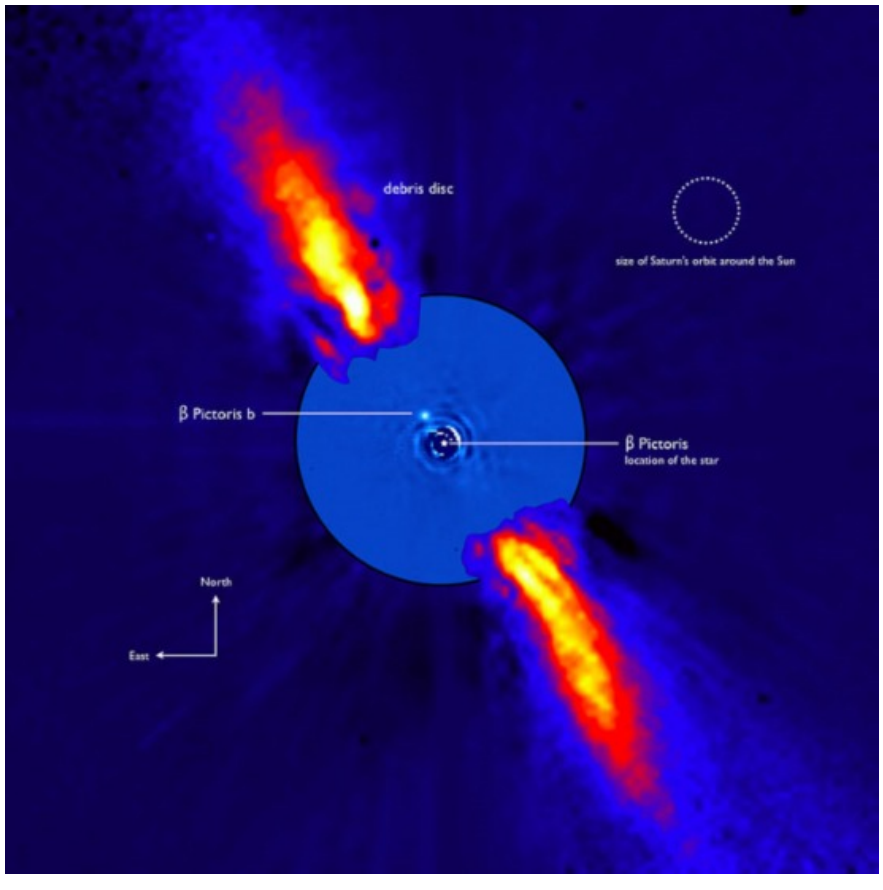
Doug handed out material on resolved debris disks from the Friedrich-Schiller-University at Jena and from NASA's Spitzer Space Telescope, the W.M. Keck Observatory and ESO's Very Large Telescope in Chile. Doug spoke about the concept of stellar disks, both debris and gaseous, the use of coronographs to block the brighter light from various aged parent stars so that the disks could be seen and resolved. More than 1,000 of these disks are 10-100 A.U. from the parent. Some of these may contain planets. Beta Pictoris may be one such candidate. Some brighter disk-containing stars are Beta Pictoris, Epsilon Eridani and Epsilon Auriga where a region of clumpy hydrogen gas (debris?) is involved. All 3 of these systems are naked-eye. This means they are open to further inspection with backyard equipment. My own spectral data show broadened Balmer lines for Vega – an indication of high-speed rotation and disk material (probably gaseous, as the star is too young to have formed a debris disk). See the HAA 2018 calendar for an image. Doug then showed an Internet programme called “Debris Disks” which elaborated on the work he was presenting.

He concluded with our own Solar System as having a multiple disk system – layers or rings, as follows: the terrestrial planets; the asteroids; the Jovian bodies; the Kuiper Objects; the ice dwarf minor planets; and the Oort Cloud.

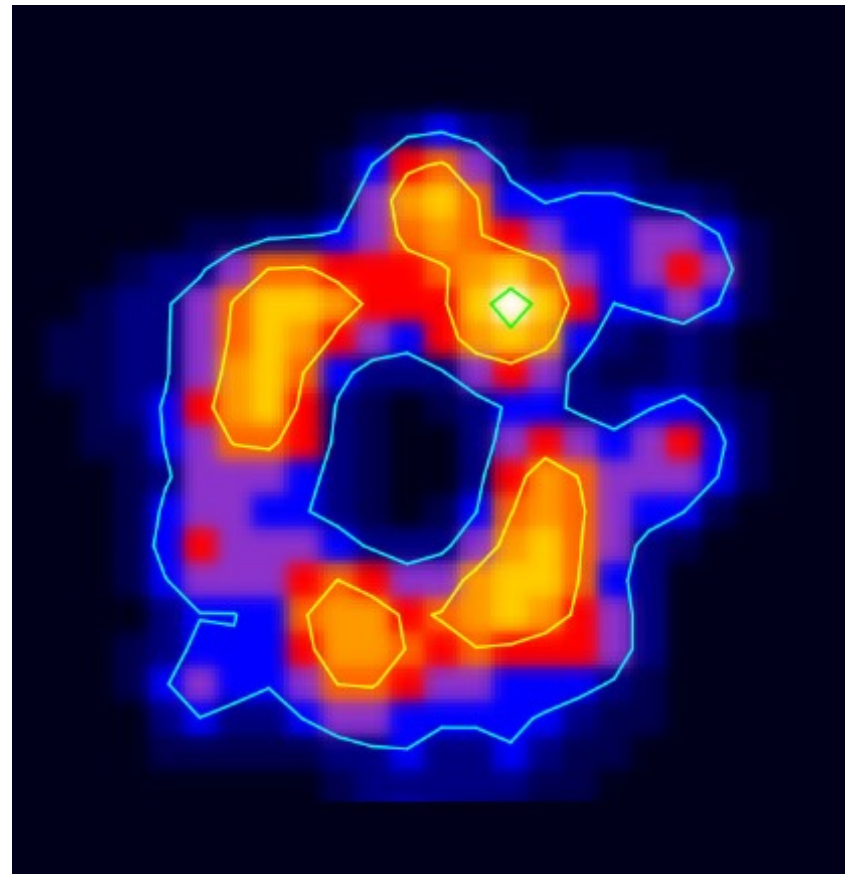
It was a very well-organized and presented topic!

Our thanks are again extended to the Blacks for the hospitality and refreshments provided.

The next meeting will likely be on Friday, October 19/2018. Watch the website for an announcement.



European Southern Observatory (ESO) image of a planet near Beta Pictoris

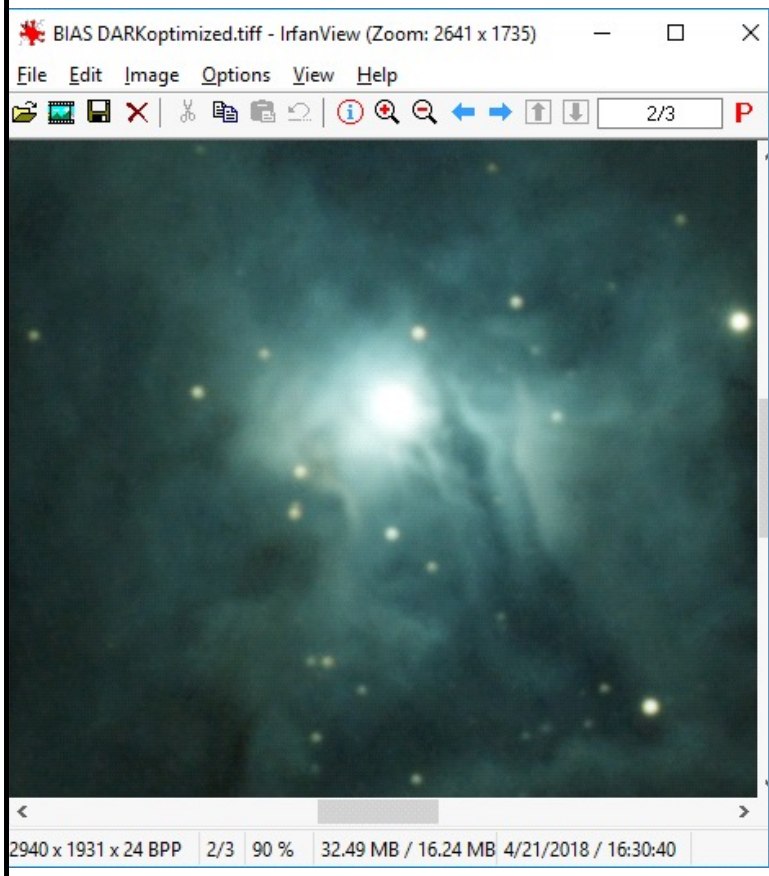


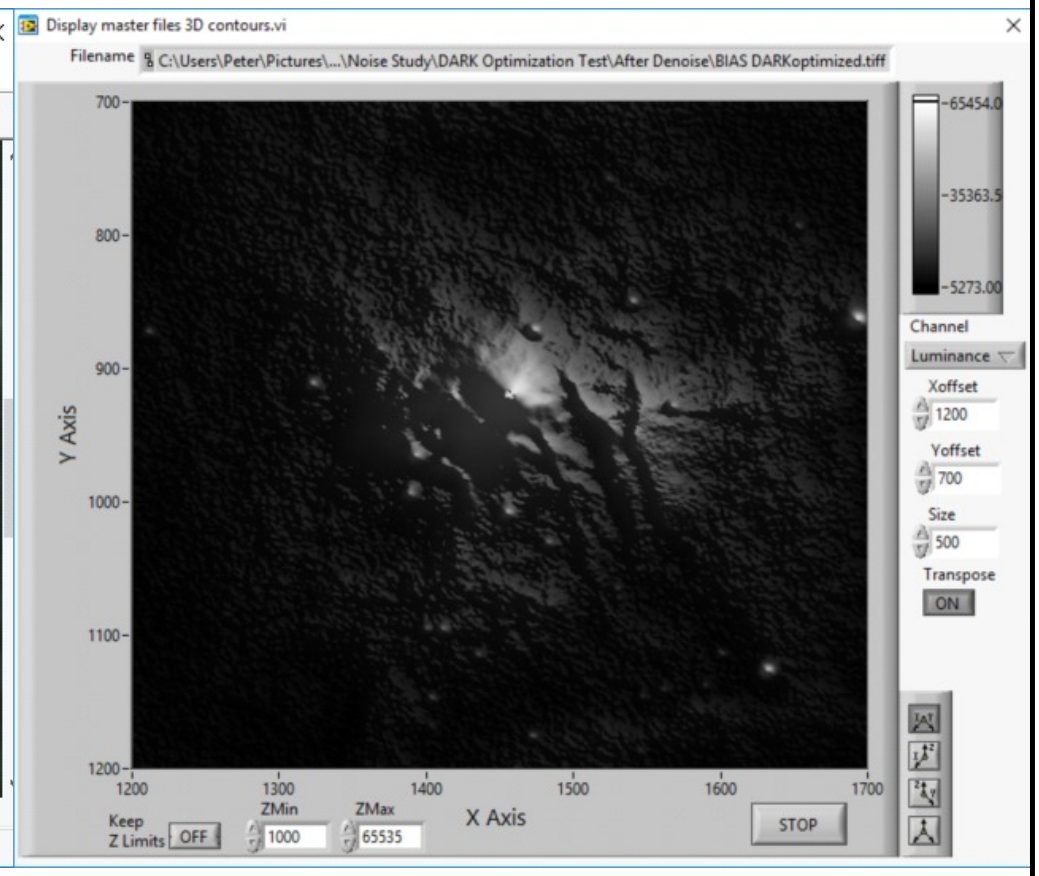
Debris Disk Around Epsilon Eridani ©astro-ph.EP

DARK Current…the devil in the details

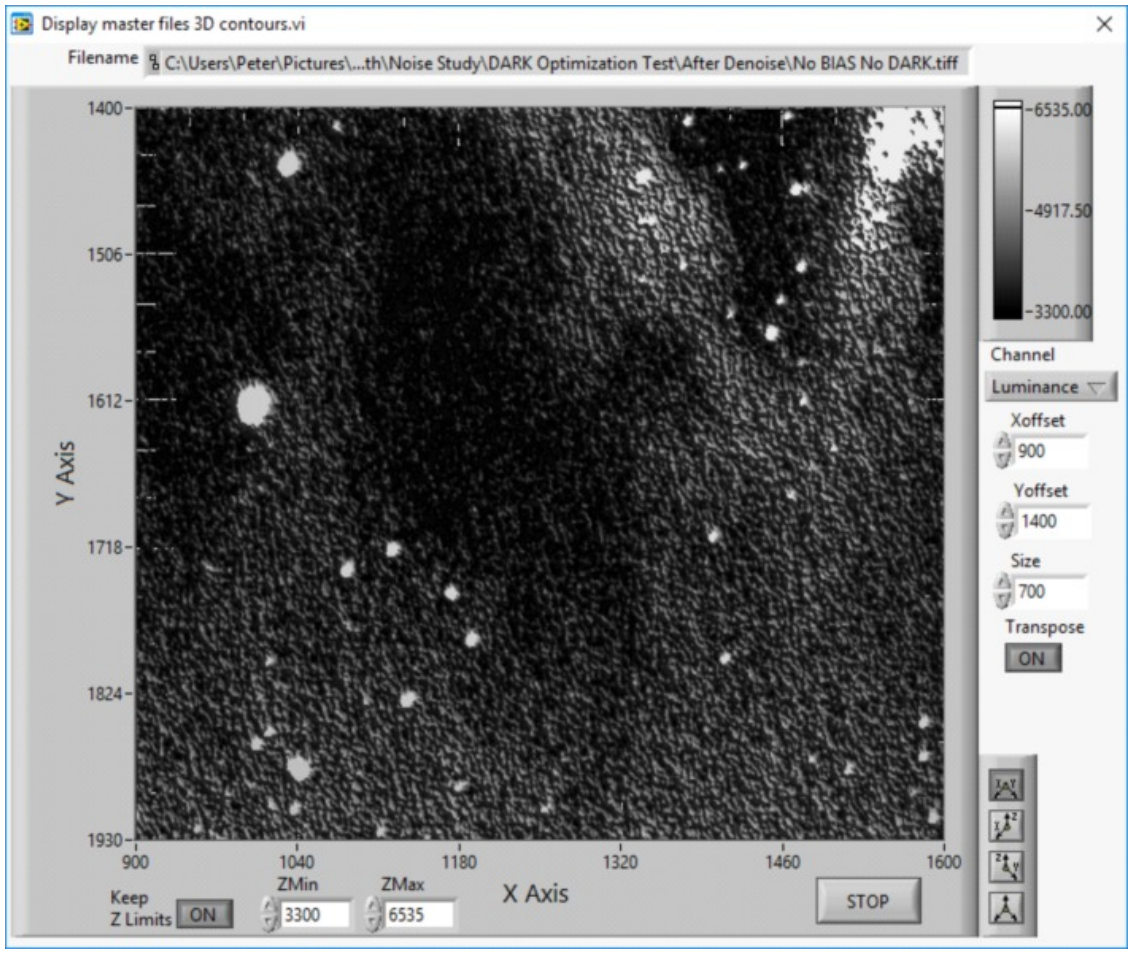
by Peter Wolsley

Here is another way of visualizing the pixel data in an astrophoto. To the left is a close-up of the Iris Nebula showing the bright central star. To the right is a 3D contour map of the luminance pixel data.





Tall, brighter mountains correspond to the brighter pixels…deep dark valleys are the darker pixels. I decided to look for the DARK signal in this astrophoto using this 3D contour map technique.

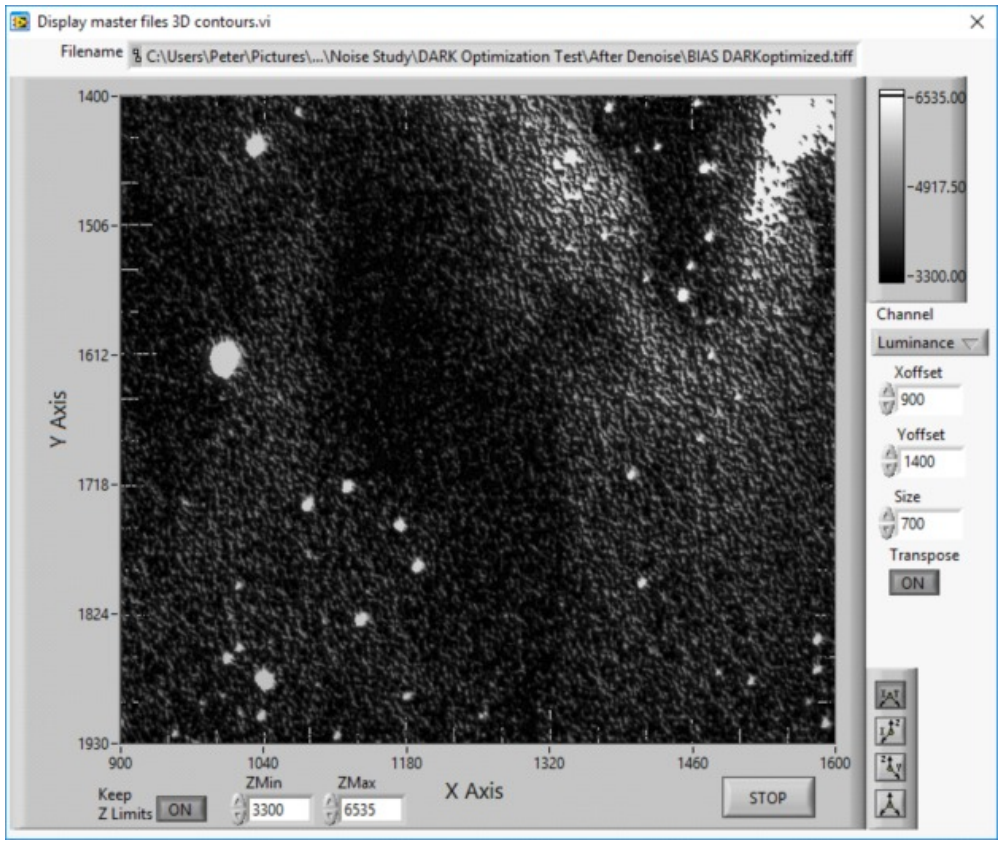


This is a 3D contour plot of the luminance data for a small 700 x 700 pixel area of my Iris Nebula photo. This image has been processed thru Startools, including the final denoise process. There were no master BIAS or DARK frames used in calibrating the individual LIGHT frames. 24 LIGHT frames were stacked. Each LIGHT frame was a 200 second exposure at ISO 1600. If you look at this image you can see vertical streaks that start to the left and streak sharply downwards and to the right. Each one of those streaks is caused by the DARK signal in my Nikon D5300. The streaks are caused by the differential flexure of my astrophotography set-up which results in the 24 images needing to be progressively slightly shifted down and to the right to keep the stars aligned. The darkest parts of

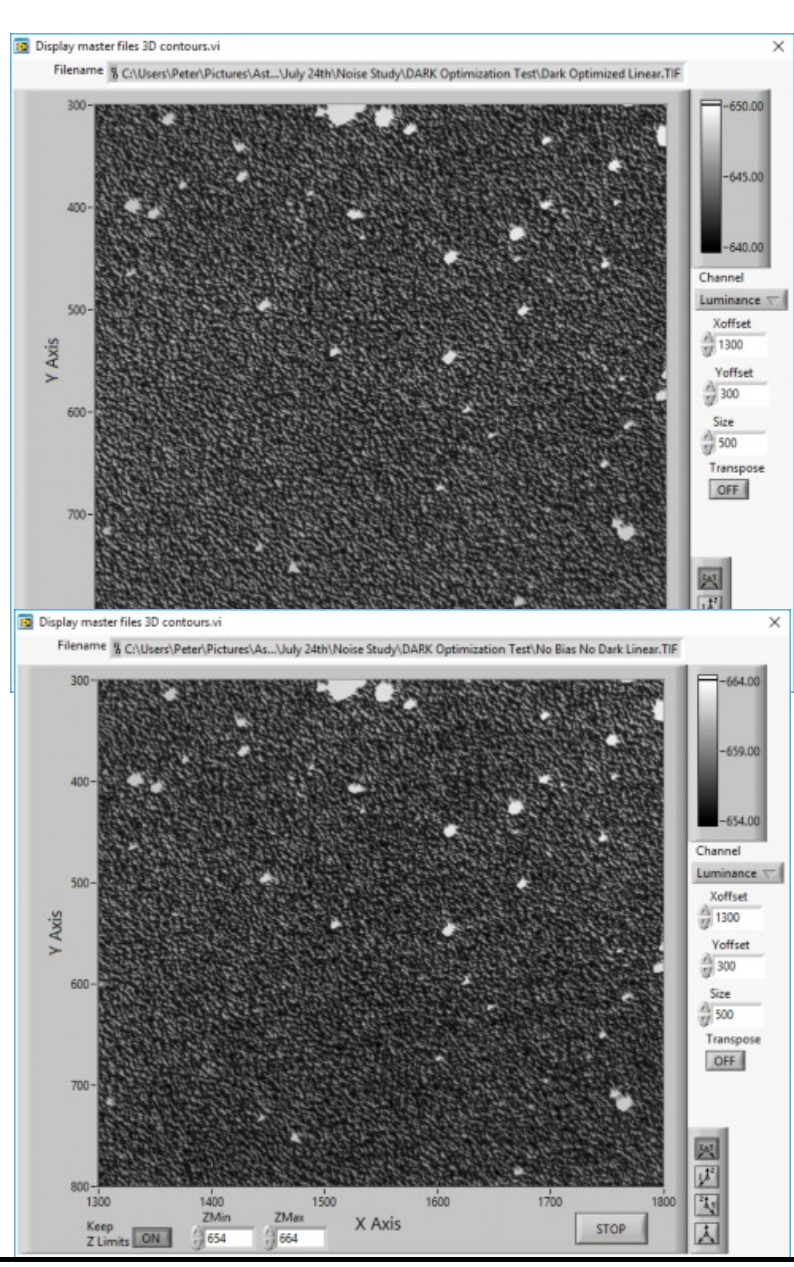
(Continued on page 9)

DARK Current…the devil in the details (continued)

this image correspond to the very darkest portions of my Iris Nebula photo.



This is the same area of the Iris Nebula but the LIGHT frames were calibrated using a master BIAS and an optimized master DARK. The optimization is unique for each LIGHT frame based upon my own method. There is still some streakiness but overall the data shows less streaks. I believe that the difference between the two photos is a partial removal of the DARK signal characteristic of my camera. Modern CMOS cameras are supposed to have less noise with many saying that for astrophotography during the winter months that DARK frames are no longer needed. I typically do not pursue astrophotography during the winter so my opinion is that DARK frames help me to cater for my differential flexure issues. I hope that DARK frames will help me dig deeper and pull out even dimmer details in my astrophotos.



Here is another example. Both these images are RAW LINEAR images which have just been stacked in Deep Sky Stacker but have not been processed in StarTools. A RAW LINEAR image means that the pixel values in the image correspond exactly to those generated in the camera RAW files (NEF or CR2). No stretching of the pixel values has been performed. The image on the left is a close-up of a different dark area of the Iris Nebula processed with no BIAS or DARK frames. You can see the DARK signal streaks rising slightly upwards from the left to the right. The direction of the streaks is different here only because I have yet to rotate the image as I perform the final processing in StarTools. The image on the right is the same close-up but master BIAS and DARK frames were used with DARK optimization. Once again the streaks are not as visible. The LIGHT frames were calibrated where Darkness = 600 and Saturation = 16384 which is the data range for my Nikon D5300 camera. The images shown here are both for a range of pixel values that spans only 10 counts. DARK signal is very small indeed but lots of the great detail in astrophotos lies in the faintest of pixels.

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!

Observe the Moon

By Jane Houston Jones and Jessica Stoller-Conrad

This year's International Observe the Moon Night is on Oct. 20. Look for astronomy clubs and science centers in your area inviting you to view the Moon at their star parties that evening!

On Oct. 20, the 11-day-old waxing gibbous Moon will rise in the late afternoon and set before dawn. Sunlight will reveal most of the lunar surface and the Moon will be visible all night long. You can observe the Moon's features whether you're observing with the unaided eye, through binoculars or through a telescope.

Here are a few of the Moon's features you might spot on the evening of October 20:

Sinus Iridum—Latin for "Bay of Rainbows"—is the little half circle visible on the western side of the Moon near the lunar terminator—the line between light and dark. Another feature, the Jura Mountains, ring the Moon's western edge. You can see them catch the morning Sun.

Just south of the Sinus Iridum you can see a large, flat plain called the Mare Imbrium. This feature is called a mare—Latin for "sea"—because early astronomers mistook it for a sea on Moon's surface. Because the Moon will be approaching full, the large craters Copernicus and Tycho will also take center stage.

Copernicus is 58 miles (93 kilometers) across. Although its impact crater rays—seen as lines leading out from the crater—will be much more visible at Full Moon, you will still be able to see them on October 20. Tycho, on the other hand, lies in a field of craters near the southern edge of the visible surface of the Moon. At 53 miles (85 kilometers) across, it's a little smaller than Copernicus. However, its massive ray system spans more than 932 miles (1500 kilometers)!

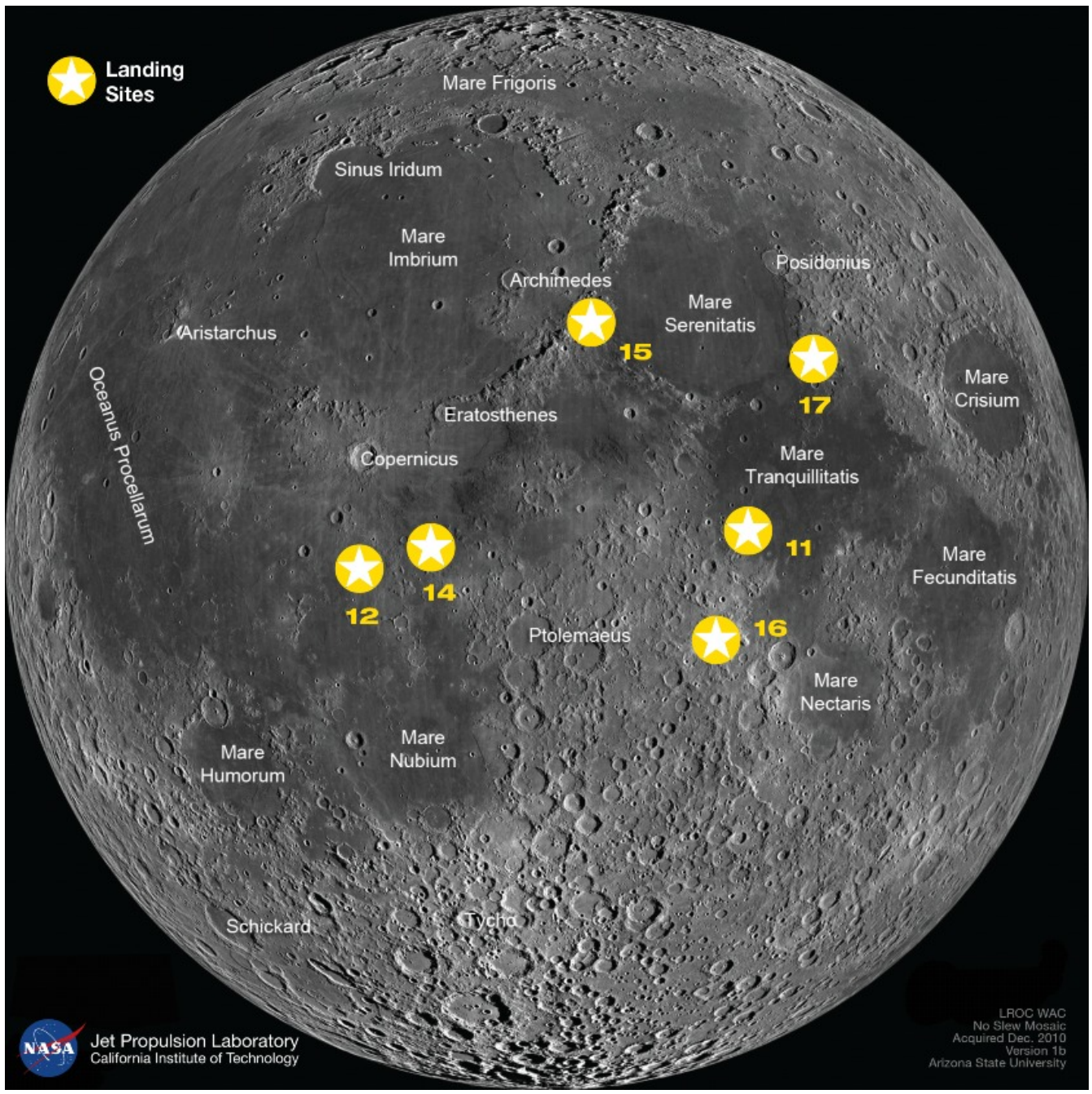
(Continued on page 11)

And if you're very observant on the 20th, you'll be able to check off all six of the Apollo lunar landing site locations, too!

In addition to the Moon, we'll be able to observe two meteor showers this month: the Orionids and the Southern Taurids. Although both will have low rates of meteors, they'll be visible in the same part of the sky.

The Orionids peak on Oct. 21, but they are active from Oct. 16 to Oct. 30. Start looking at about 10 p.m. and you can continue to look until 5 a.m. With the bright moonlight you may see only five to 10 swift and faint Orionids per hour.

If you see a slow, bright meteor, that's from the Taurid meteor shower. The Taurids radiate from the nearby constellation Taurus, the Bull. Taurids are active from Sept. 10 through Nov. 20, so you may see both a slow Taurid and a fast Orionid piercing your sky this month. You'll be lucky to see five Taurids per hour on the peak night of Oct. 10.



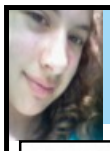
You can also still catch the great lineup of bright planets in October, with Jupiter, Saturn and Mars lining up with the Moon again this month. And early birds can even catch Venus just before dawn!

You can find out more about International Observe the Moon Night at https://moon.nasa.gov/observe

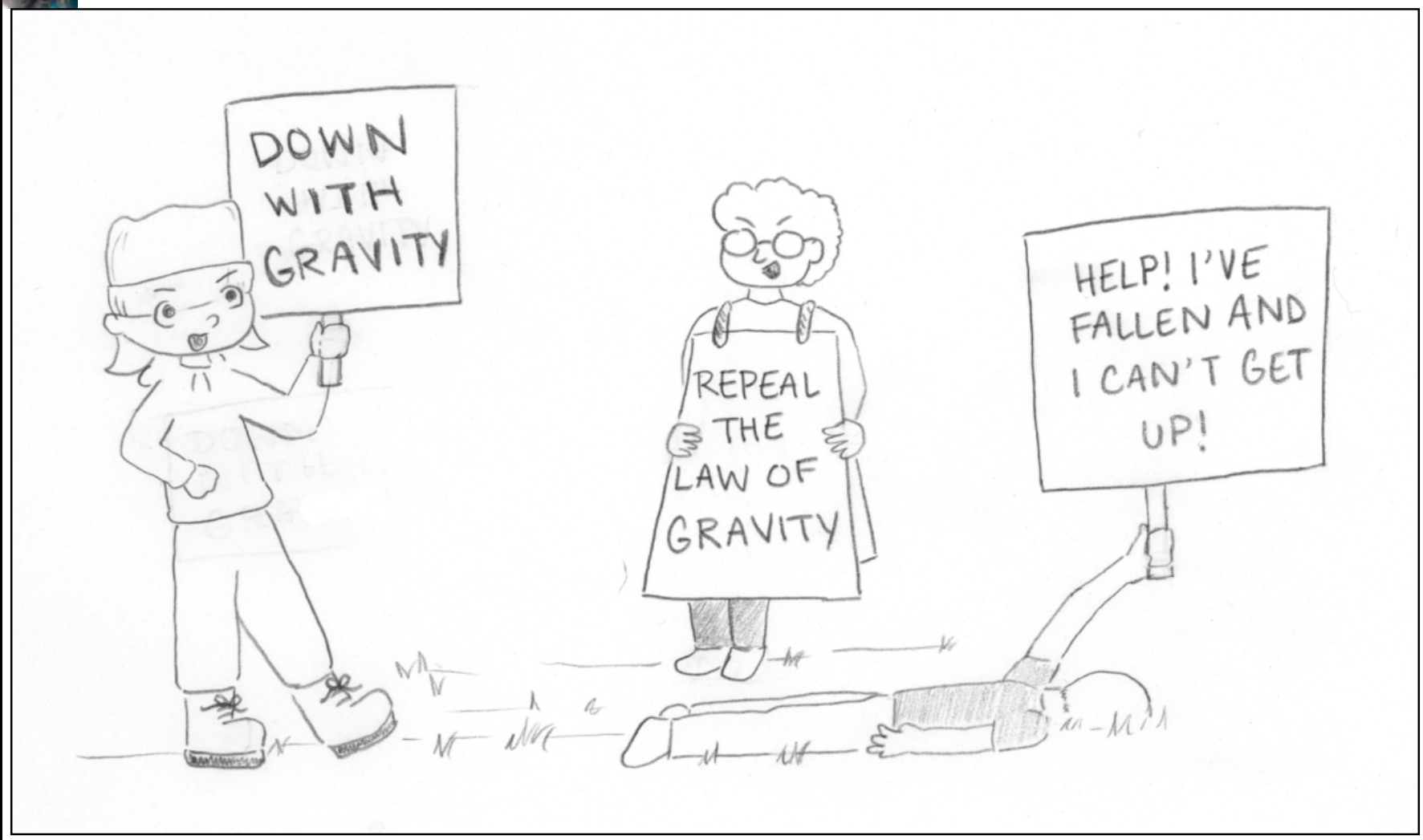
This image shows some of the features you might see if you closely observe the Moon. The stars represent the six Apollo landing sites on the Moon. Credit: NASA/GSFC/Arizona State University (modified by NASA/JPL-Caltech)

Eye Candy the Members' Image Gallery

Open cluster **M52**, NGC 7635 the **Bubble Nebula**, and other nebulosity on the Cassiopeia-Cepheus border, by **Peter Wolsley**, taken September 11, 2018. Peter used his Nikon D5300-Ha modified camera and his Skywatcher BK80ED 80mm refracting telescope, with a 0.85 flattener/reducer for 10 four minute exposures at ISO 800, stacked using DSS and processed using StarTools.



Cartoon Corner by Alexandra Tekatch



Gravity Demonstration

Treasurer's Report by Ann Tekatch

Treasurer's Report for September 2018 (Unaudited)

Opening balance:	$10,841.78
Revenue:	
Memberships (Paypal):	$120.00
Memberships:	$410.00
50/50 Draw:	$36.00
Picnic Ticket Sales:	$280.00
Donations:	$25.00
Expenses:	
P.O. Box:	$187.58
Picnic:	$1,186.31
Spectator Auditorium 2018-2019:	$1,290.00
Binbrook Conservation Area Donation:	$200.00
Clear Sky Chart Sponsorship:	$50.00
PayPal fees - Memberships:	$4.68
PayPal fees - Picnic Ticket Sales:	$9.24
HAA Address Stamp:	$21.13
Closing Balance:	$8,763.84

William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- **Public shows every Wednesday (7:00pm)**
- **Public transit available directly to McMaster campus**
- **Tickets $7 per person; private group bookings $150**
- **Different shows every week**
- **Upcoming shows include:**

  – **Oct 3: Introductory Astronomy for Kids — Galaxies**
  – **Oct 10: James Webb Space Telescope: Acrobat, Time Machine, Spying Glass**
  – **Oct 17: Death from the Skies!**
  – **Oct 24: Carl Sagan's Universe**

- **For more details, visit www.physics.mcmaster.ca/planetarium**

UPCOMING EVENTS

October 12, 2018 - 7:30 pm — *Annual General Meeting* at the Hamilton Spectator Auditorium. Our speaker will be ***Dr. Paul Delaney*** of York University.

October 20, 2018 - 8:00 pm - 11:00 pm — *Public Stargazing Night* at the Niagara Gateway Tourism Centre, Grimsby, ON. As this month's NASA Space Place article points out, this is International Observe the Moon Night.

November 9, 2018 - 7:30 pm — *HAA Meeting* at the Hamilton Spectator Auditorium.

2017-2018 Council

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