



# Event Horizon

**Volume 21, Number 10**  
**October 2014**



## From The Editor

It's October already, and where has the time flown this 2014!?!?  
Fall is usually a great time for observing and astrophotography. But on cloudy nights, you can always kick back, relax, and read the Event Horizon!

Cheers!

*Bob Christmas,  
Editor*



## Chair's Report by Jim Wamsley

The October meeting of the Hamilton Amateur Astronomers is the club's Annual General Meeting. At this meeting, we look after the necessary club business. Our treasurer, Steve Germann, will deliver our annual financial report, David Tym our Web Master will tell us about our newly redesigned Website, and of course, there will be the election of a new council for 2014/2015. I strongly encourage all members to get more involved in the running of your club. You can contact me, or if you like just nominate yourself or a friend, for a position from the floor at the A.G.M. All council meetings are open to members. If you want to test the water before getting involved, come out to one or two. Just ask me or any other council member for the date and time.

The club's Observing Director, Matthew Mannering, will be giving us a slightly extended version of his "Sky this Month" at the A.G.M. as we traditionally don't have an invited speaker due to the longer business portion of the meeting. We are very fortunate to have such a knowledgeable and entertaining Observing Director in Matthew.

Other club activities coming up in October: Saturday Oct. 4th a Public night at Bayfront Park. Come on out and share a view, or get some help with your scope from a friendly club member. Saturday Oct 11th we will be starting the Astro Photo group meetings once again, after the summer break. Bring your photo gear, it's only one day past full moon and maybe we can slide outside and *(Continued on [page 2](#))*

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## Chair's Report (continued)

get some photos and compare techniques. I know it's Thanksgiving weekend but if you're around and short of something to do, please join us. Make sure to add the Friday Nov.7th Fall scope clinic to your calendar. Dust off and bring out your latest scope purchase for show and tell.

On a personal note, I was feeling a little guilty over the weekend (Sept. 25-28) as I was down in Cherry Springs PA (see photos below), and not at home opening Binbrook Park for the membership. I was much relieved and happy to see that Kevin Salwach opened it on Friday and Don Pullen opened the park on Saturday. Cheers to you both. I had made a pact with my good friend and club member Leslie Webb, while we were at Cherry springs in June (in the RAIN) if the weather looked good for the dark of the moon in September we would return and make up for the lost observing. The trip was great, the weather was great, and skies were clear. We both had a great time observing, taking some astro photo shots, and renewing some old friendships with our American friends. I had a few technical problems with my auto guider so wasn't able to get a lot of good astro photos myself, but Leslie had some great results with his efforts. I was able to relive my frustration with the superb views of the night sky I had and shared.

See you at the Public Night Oct.4th or the Meeting Oct.10th.



### HAA Helps Hamilton



To support our community, we will be collecting 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. If you would like to help or have any questions about this initiative, please contact Jim Wamsley at 905-627-4323.

**Masthead Photo:** *Comet Jacques (C/2014 E2), by Bob Christmas.*

Taken September 23, 2014 at about 9:20 pm EDT.

Composite of 6 one-minute exposures (6 mins total) taken through a 300mm f/2.8 lens with a Canon 40D digital SLR camera set at f/2.8 and ISO 1600.

This comet was on the Sagitta/Aquila border at the time. North is to the right.





## The Sky This Month for October 2014 by Matthew Mannering

With the change of seasons from summer to fall, it's time to think about the changing of constellations that are prominent in the evening sky. If you stay up till 10pm you'll see the **Pleiades (M45)** rise in the East and around 2am **Orion** will have cleared the horizon. By the beginning of December you'll be able to see Orion clearing the horizon at 9pm and you'll know winter is here.

Make sure to read further down about the **Lunar and Solar Eclipses** occurring this month. Let's hope for clear skies for these relatively rare events!

Another significant event occurs on the 19th when **comet Siding Spring** passes about 80,000 km from **Mars**. We should be able to see this in the two hours before Mars sets in the South-West. Currently no one can predict how bright this comet will be. Start looking at 7:00pm for Mars. It will appear about 15 degrees above the horizon just West of South. As it gets darker the comet should become visible by telescope. Let's hope that all of our satellites and the Rovers on Mars get a great view of the event.



So in October what does the sky show us? Lets start in the *West* at about 8:30pm.

[Please refer to directional skymaps on pages 4 and 5.]

**Bootes** is already setting in the west along with **Serpens Caput**. **Ophiuchus** is still high enough that you may get a shot at two Globulars **M10** and **M12**. **Corona Borealis** sits below **Hercules** which contains the prize Globular **M13**. In the image above, it's called the Great Cluster. Make sure you get a look at this one before Hercules sets for the winter.

The Southern sky is next and is still very busy with the last chance to see the summer Milky Way.

**Sagittarius** sits just above the horizon and the Milky Way Stretches up into the sky, continues through the zenith and then descends into **Cassiopeia**. **Capricorn** and **Aquarius** lie to the East and the star **Formalhaut** sits low in the sky. Some of the summer Messier objects are still visible above Sagittarius such as the Eagle (**M16**), the Omega, also called the Swan (**M17**) and the Wild Duck Cluster (**M11**). The **Scutum star cloud** is a particularly bright section of the Milky Way and worth a look with binoculars. In fact the whole Milky Way is fantastic with binos especially sitting back in a reclining chair. Use a planetarium program such as Stellarium to find the exact location of **Neptune** in **Aquarius**. It should show up as a deep blue point of light, whether you look at it with binoculars or a small telescope. With a larger scope you may be able to discern the disc.

Now let's move on to the *Eastern* sky.

**Pisces** fills the lower part of the sky but is notoriously hard to discern when light pollution is present. **Uranus** can also be found here with the help of Stellarium. Much easier (Continued on [page 4](#))

## The Sky This Month (continued)



to view are **Perseus**, **Andromeda** and **Pegasus**. The **Andromeda Galaxy** is an easy catch and best viewed through binos. While you're at it, look at the Alpha Persei star Cluster around **Mirfak** in **Perseus**. Just above Perseus is the **Double Cluster**, nice in binoculars but even nicer using a low power eyepiece on your scope. *(Continued on [page 5](#))*



## The Sky This Month (continued)



Now for the *Northern* view.

**Auriga** is rising in the North-East and will be fully visible by 9:15pm. Have a look for the **Small Dipper**. The handle ends at **Polaris** the North Star. The ladle consists of four stars but two of the stars are easier to spot than the others. The two named stars in the picture above are the ones you will spot

(Continued on [page 6](#))

## The Sky This Month (continued)

first. Remember the ladle of the Little Dipper pours into the ladle of the Big Dipper and the body of Draco divides the space between them. Draco then winds itself around the Little Dipper and its head looks down on Hercules.

Lastly, lets look overhead.



The Milky way passes directly overhead with **Cygnus** embedded in it. **Albireo** is the head of the Swan and is also considered the finest double star in the Northern sky. Whether or not you've already looked at this double, it's always worth another view. **Cepheus** is a roughly house shaped constellation that sits between Cygnus and Polaris. This time of year it appears to be upside down when looking at the Northern horizon. **Vega** shines brightly and anchors the constellation of **Lyra** while on the other side of Cygnus you'll find the little constellation of **Sagitta** (the Arrow). The bright star **Altair** outshines all others in the constellation of **Aquila** (the Eagle) with only the stars above and below it readily visible.

This month I challenge you to go out and identify as many of these constellations as you can. As well I've mentioned a few objects scattered across the sky for you to look at with either binos or scope. It's only going to get colder, so make the most of the viewing opportunities in October.

### The Moon

*Libration* is the apparant visual wobble of the Moon that we see throughout the month. A good map of the Moon will show these regions all around the outer edge that are only visible when the wobble brings them into view. Use the dates listed below to determine the best time of the month to see craters, mountain ranges and seas in those areas. Libration favours the *North limb* on the 15th. The *East limb* is favoured on the 12th. The *South limb* is at its best on the 2nd and 29th while the *West limb* is favoured on the 25th.

The exciting observation of the Moon occurs in the western sky on the 8th of this month when we have a *Lunar Eclipse*. You'll have to be up early but it will be worth it. You'll need a clear view of the western horizon to see the end of totality as the Moon sets 5 minutes later. As a bonus, the planet **Uranus** will be less than one lunar diameter away during totality. This is a great time to try for a photo! I've included a picture showing how this will appear to you at 6:30am (next page). (Continued on [page 7](#))



## The Sky This Month (continued)

### Moon

Magnitude: 10.12, (extincted to: 11.25)  
Absolute Magnitude: 54.76  
RA/DE (J2000): 0h50m28.1s/+5°28'52.1"  
RA/DE (of date): 0h51m14s/+5°33'40"  
Hour angle/DE: 5h26m12s/+5°33'40" (geometric)  
Hour angle/DE: 5h25m57s/+5°37'17" (apparent)  
Az/Alt: +268°17'39"/+9°57'39" (geometric)  
Az/Alt: +268°17'39"/+10°02'57" (apparent)  
Ecliptic Geocentric (of date): +13°56'40.5"/+0°03'57.8"  
Obliquity (of date): +23°26'14.5"  
Distance: 0.00243627AU (364460 km)  
Apparent diameter: +0°32'46.5"  
Phase Angle: +1°07'51"  
Elongation: +178°51'59"  
Phase: 1.00  
Illuminated: 100.0%



Earth, Brantford, 212m

FOV 3.67°

15.7 FPS

2014-10-08 06:30:32

### The Sun

The Moon isn't the only one to have a special day this month. On the **23rd** there will be a **Partial Eclipse of the Sun**. The Eclipse will start at roughly 5:39pm and reach it's maximum at sunset at 6:20pm with about 45% of the face covered. **Please remember to use safe methods for viewing any solar event.** As long as any part of the Sun's disc is visible, it is too bright to look at with a naked eye. Doing so is a sure fire way to permanently damage or destroy your eyesight. If you are unsure how to observe the sun safely, don't look.

### The Planets:

- **Mercury** is setting at dusk and won't appear again until early November as it makes it's best early morning appearance of the year.
- **Venus** is approaching superior conjunction on the 25th. That means it's on the other side of the Sun from our position and it is about to disappear behind it. Venus won't appear in the evening sky until early December.
- **Mars** continues to be low in the South-West this month and set by mid evening. Look for it on the 27th only ½ degree below the Lagoon Nebula (M8).



(Continued on [page 8](#))

## The Sky This Month (continued)

- **Jupiter** rises at 3:00am at the beginning of the month and 1:00am at months' end.
- **Saturn** is very low in the West now and will disappear below the horizon by months' end.
- **Uranus** is at opposition on the 7th. Look for it about one lunar diameter away from the lunar eclipse on the 8th in the morning.
- **Neptune** is in Aquarius in the South-East at dusk and is well placed until well into the wee hours of the night.

### Other Events:

- October 1st: First quarter Moon.
- October 7th: Uranus is at opposition.
- October 8th: Full Moon. **Total lunar eclipse with Uranus along side.**
- October 15th: Last Quarter Moon.
- October 19th: Comet Siding Spring at Mars.
- October 23rd: New Moon. **Partial Solar Eclipse.**
- October 30th: 5:45am Jupiter and Venus only 0.25 degrees apart.



## Treasurer's Report by Steve Germann

### Treasurer's report for October 2014 (unaudited)

Opening balance:	\$6594.45
Revenue:	\$571.00
Expenses:	\$172.56
Closing Balance:	\$6992.89

Revenue included 50/50 of \$61 and membership renewals for \$510.

Expenses included a \$3.06 adjustment for the price of SkyNews magazine shipping, and \$169.50 for next year's post office box.





Hamilton at dawn, with Jupiter & The Moon rising, by Janina Plach

Taken at dawn on September 18, 2014.



### Twinkle, twinkle, variable star

By Dr. Ethan Siegel

As bright and steady as they appear, the stars in our sky won't shine forever. The steady brilliance of these sources of light is powered by a tumultuous interior, where nuclear processes fuse light elements and isotopes into heavier ones. Because the heavier nuclei up to iron (Fe), have a greater binding energies-per-nucleon, each reaction results in a slight reduction of the star's mass, converting it into energy via Einstein's famous equation relating changes in mass and energy output,  $E = mc^2$ . Over timescales of tens of thousands of years, that energy migrates to the star's photosphere, where it's emitted out into the universe as starlight.

There's only a finite amount of fuel in there, and when stars run out, the interior contracts and heats up, often enabling heavier elements to burn at even higher temperatures, and causing sun-like stars to grow into red giants. Even though the cores of both hydrogen-burning and helium-burning stars have consistent, steady energy outputs, our sun's overall brightness varies by just  $\sim 0.1\%$ , while red giants can have their brightness's vary by factors of thousands or more over the course of a single year! In fact, the first periodic or pulsating variable star ever discovered—Mira (omicron Ceti)—behaves exactly in this way.

There are many types of variable stars, including Cepheids, RR Lyrae, cataclysmic variables and more, but it's the Mira-type variables that give us a glimpse into our Sun's likely future. In general, the cores of stars burn through their fuel in a very consistent fashion, but in the case of pulsating variable stars the outer layers of stellar atmospheres vary. Initially heating up and expanding, they overshoot equilibrium, reach a maximum size, cool, then often forming neutral molecules that behave as light-blocking dust, with the dust then falling back to the star, ionizing and starting the whole process over again. This temporarily neutral dust absorbs the visible light from the star and re-emits it, but as infrared radiation, which is invisible to our eyes. In the case of Mira (and many red giants), it's Titanium Monoxide (TiO) that causes it to dim so severely, from a maximum magnitude of +2 or +3 (clearly visible to the naked eye) to a minimum of +9 or +10, requiring a telescope (and an experienced observer) to find!

Visible in the constellation of Cetus during the fall-and-winter from the Northern Hemisphere, Mira is presently at magnitude +7 and headed towards its minimum, but will reach its maximum brightness again in May of next year and every 332 days thereafter. Shockingly, Mira contains a huge, 13 light-year-long tail -- visible only in the UV -- that it leaves as it rockets through the interstellar medium at 130 km/sec! Look for it in your skies all winter long, and contribute your results to the AAVSO (American Association of Variable Star Observers) International Database to help study its long-term behavior!

*(Continued on [page 11](#))*

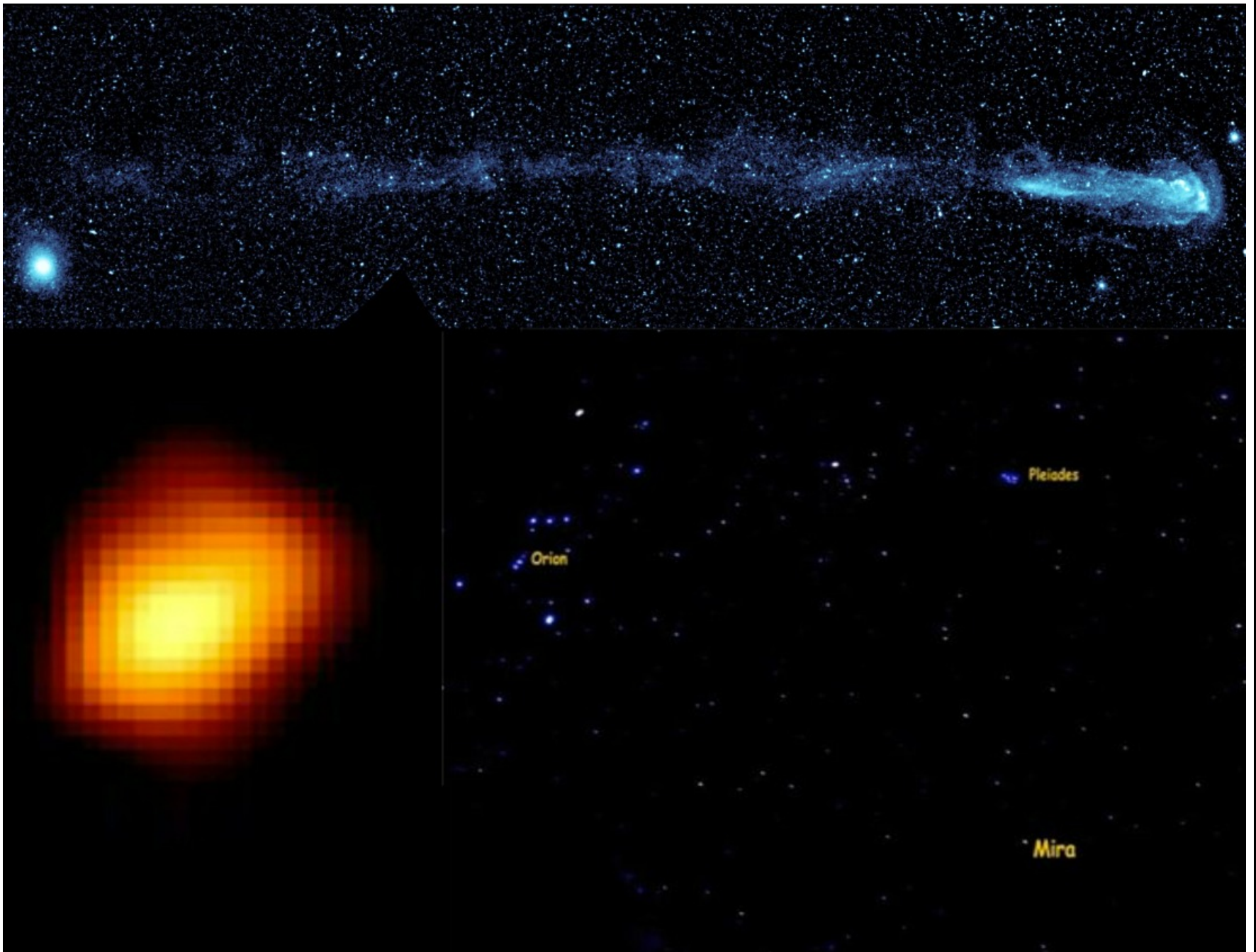


## NASA's Space Place (continued)

Check out some cool images and simulated animations of Mira here:

[http://www.nasa.gov/mission\\_pages/galex/20070815/v.html](http://www.nasa.gov/mission_pages/galex/20070815/v.html)

Kids can learn all about Mira at NASA's Space Place: <http://spaceplace.nasa.gov/mira/en/>



*Images credit: NASA's Galaxy Evolution Explorer (GALEX) spacecraft, of Mira and its tail in UV light (top); Margarita Karovska (Harvard-Smithsonian CfA) / NASA's Hubble Space Telescope image of Mira, with the distortions revealing the presence of a binary companion (lower left); public domain image of Orion, the Pleiades and Mira (near maximum brightness) by Brocken Inaglory of Wikimedia Commons under CC-BY-SA-3.0 (lower right).*



# William J. McCallion Planetarium

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- 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 1: Introductory Astronomy for Kids (1<sup>st</sup> Wed of every month)**
  - **Oct 8: Eclipses**
  - **Oct 15: Backyard Astronomy**
  - **Oct 22: Life in the Universe - Setting the Stage**
  - **Oct 29: Life in the Universe - The Search**
- For more details, visit  
[www.physics.mcmaster.ca/planetarium](http://www.physics.mcmaster.ca/planetarium)





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## UPCOMING EVENTS

October 4, 2014 - 7:30 pm to 11 pm – *Public Stargazing Night* at Bayfront Park in Hamilton.  
 October 10, 2014 - 7:30 pm – *Annual General Meeting* at the Hamilton Spectator Auditorium.  
 Also, HAA Observing Director **Matthew Mannering** will give an extended *The Sky This Month* talk.  
 October 11, 2014 - 7:30 – *Astro Photo workshop* for HAA members (contact HAA Chair for details).  
 November 7, 2014 - 7:30 pm – *Fall Scope Clinic* at the Hamilton Spectator Auditorium.  
 November 14, 2014 - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium.

## 2013-2014 Council

Chair	Jim Wamsley
Second Chair	John Gauvreau
Treasurer	Steve Germann
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Event Horizon Editor	Bob Christmas
Recorder	Mike Jefferson
Secretary	Joe McArdle
Public Education	Mario Carr
Councillors at Large	Brenda Frederick Harvey Garden Ann Tekatch David Tym

Observing site for the HAA provided with the generous support of the

### Binbrook Conservation Area

Come observing with the HAA and see what a great location this is for stargazing, a family day or an outdoor function.

Please consider purchasing a season's pass for \$79 to help support the park.

<http://www.npca.ca/conservation-areas/binbrook/>  
 905-692-3228

Check out the newly-redesigned  
 Hamilton Amateur Astronomers  
**Website**

[www.amateurastronomy.org](http://www.amateurastronomy.org)

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