



ASTROFILES

Auburn Astronomical Society Newsletter

November 2023 *Newsletter Editor — John Wingard — jwin1048@gmail.com*

Moon Phases

December 5 — Last Quarter
December 12 — New Moon
December 19 — First Quarter
December 26 — Full Moon
January 3 — Last Quarter
January 11 — New Moon
January 17 — First Quarter
January 25 — Full Moon

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News and upcoming activities

As 2023 begins to wind down, we hope that everyone is ready for the holiday season and with the cooler (or colder) temperatures and longer nights, there are plenty of opportunities to do some observing or imaging. We also have some great news to share this month. As was mentioned in our last newsletter, the W.A. Gayle Planetarium in Montgomery has a new director/coordinator and is preparing to reopen to the public in January. To help make the public aware of this, the planetarium is having a free open house this coming Saturday, December 2, 2023. The Auburn Astronomical Society has been invited to come and assist with the event by bringing solar-equipped scopes to give the attendees some views of the Sun. All AAS members that can attend are encouraged to come and support the planetarium just like we have done for many years in the past. The event is scheduled for 10 AM—3 PM. Inside the dome there will be trailers of upcoming shows as well as demos of the night sky around Montgomery as well as a short laser show. The first official show, a program about the planets, will start in January. Planetarium director Lee Tinker has also extended an invitation to AAS members to come and view the January show for free, either as a group or individually, as thanks for our help with the open house activities. The Gayle Planetarium is located within Oak Park, 1010 Forest Avenue, adjacent to the Jackson Hospital complex. It can be accessed easily from I-85, either from Exit 2 Northbound or Exit 3 Southbound. At this time the weather forecast has the possibility of rain but even if we don't get a chance to view the Sun, we still need to come and support the planetarium, meet the new director and learn about their plans for the future. We are looking forward to seeing everyone there!





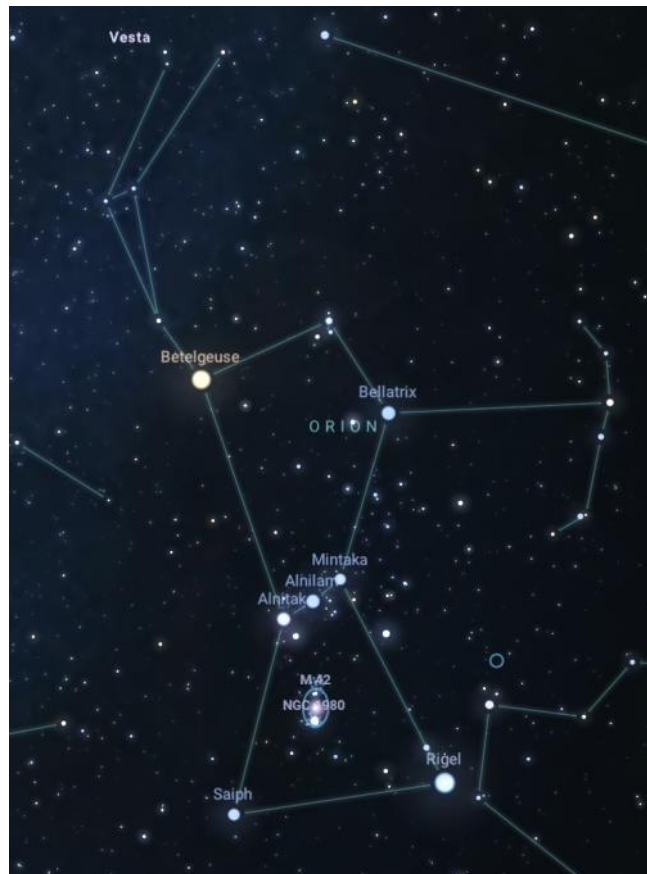
This article is distributed by NASA's Night Sky Network (NSN).

The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

A Flame in the Sky – the Orion Nebula

By Kat Troche

It's that time of year again: winter! Here in the Northern Hemisphere, the cold, crisp sky offers spectacular views of various objects, the most famous of all being Orion the Hunter.

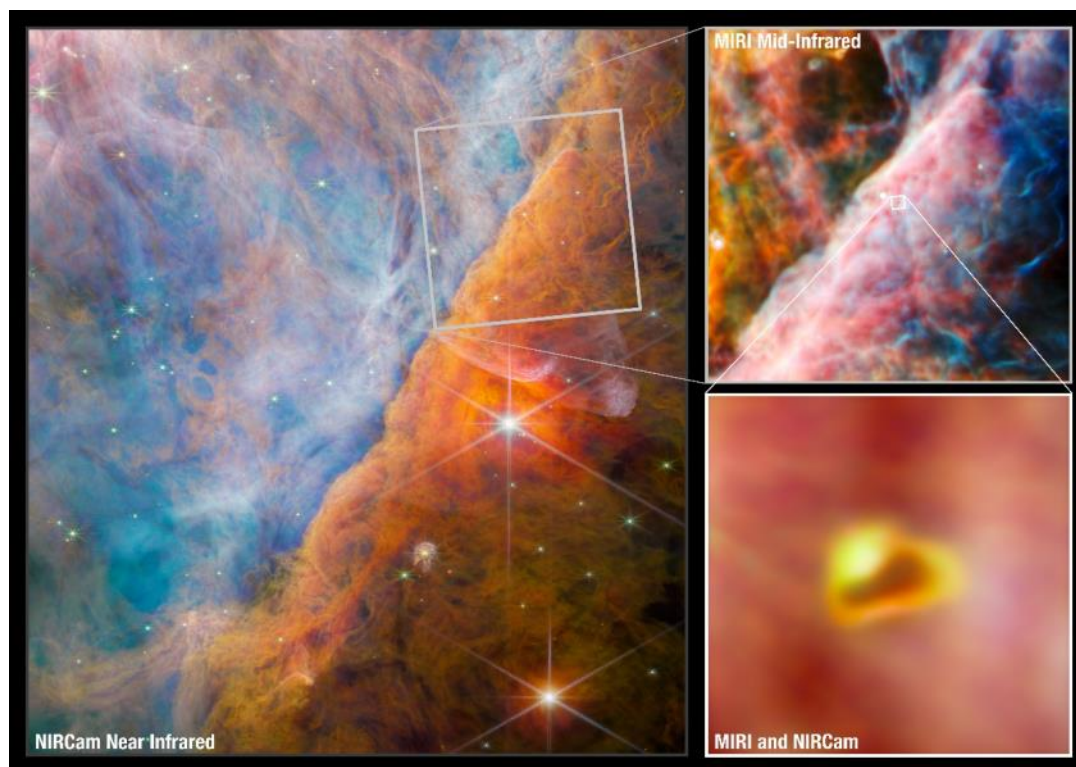


Credit: Stellarium Web

As we've previously mentioned, Orion is a great way to test your sky darkness. With your naked eye, you can easily spot this hour-glass-shaped constellation. Known as an epic hunter in Greco-Roman, Orion and all its parts have had many names and meanings across many cultures. In Egyptian mythology, this constellation represented the god *Sah*. The Babylonians referred to it as *The Heavenly Shepard*. In most cultures, it is Orion's Belt that has many stories: *Shen* in Chinese folklore, or *Tayamnicankhu* in Lakota storytelling. But the Maya of Mesoamerica believed that part of Orion contained *The Cosmic Hearth* – the fire of creation.

1,500 light years away from Earth sits the star-forming region and crown jewel of Orion – Messier 42 (M42), the Orion Nebula. Part of the “sword” of Orion, this cloud of dust and gas sits below the first star in Orion’s Belt, Alnitak, and can easily be spotted with the naked eye under moderate dark skies. You may also use binoculars or a telescope to resolve even more details, like the Trapezium: four stars in the shape of a baseball diamond. These young stars make up the core of this magnificent object.

Of course, it’s not just for looking at! M42 is easily one of the most photographed nebulae around, by astrophotographers here on the ground, large ground-based observatories, and space telescopes alike. It has long been a place of interest for the Hubble, Spitzer, and Chandra X-ray Space Telescopes, with James Webb Space Telescope joining the list in February 2023. Earlier this year, NASA and the European Space Agency released a new photo of the Orion Nebula taken from JWST’s NIRCam (Near-Infrared Camera), allowing scientists to image this early star forming region in both short and long wavelengths.



ESA/Webb, NASA, CSA, M. Zamani (ESA/Webb), PDRs4ALL ERS Team

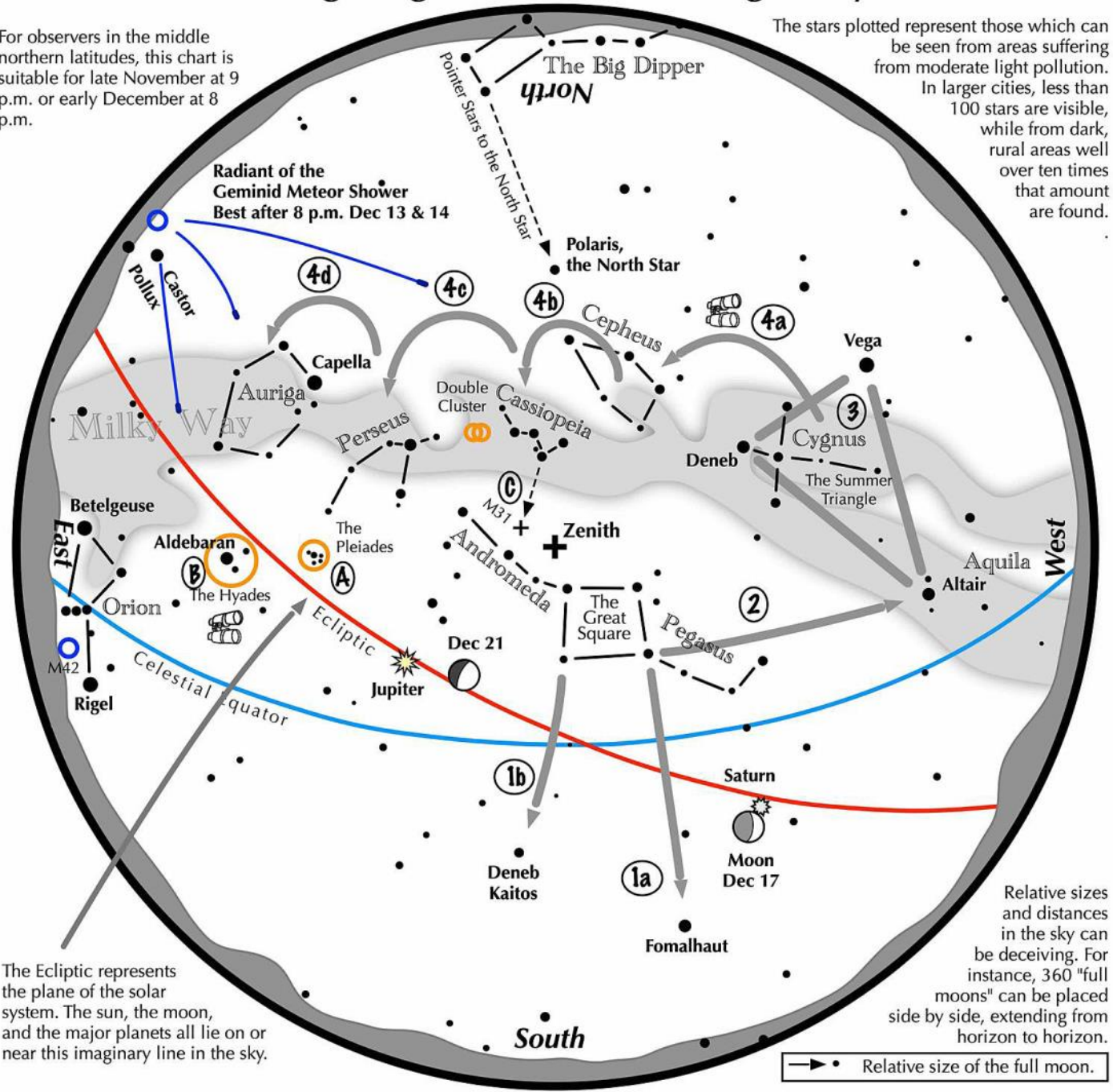
But stars aren’t the only items photographed here. In June 2023, JWST’s NIRCam and MIRI (mid-infrared instrument) imaged a developing star system with a planetary disk forming around it. That’s right – a solar system happening in real time – located within the edges of a section called the Orion Bar. Scientists have named this planet-forming disk **d203-506**, and you can learn more about the chemistry found here. By capturing these objects in multiple wavelengths of light, we now have even greater insight into what other objects may be hiding within these hazy hydrogen regions of our night sky.

In addition to our Dark Sky Wheel, a fun presentation you can share with your astronomy club would be our *Universe Discovery Guide: Orion Nebula, Nursery of Newborn Stars* activity. This will allow you to explain to audiences how infrared astronomy, like JWST, helps to reveal the secrets of nebulae. Or, you can use public projects like the NASA-funded MicroObservatory to capture M42 and other objects.

Navigating the December Night Sky

For observers in the middle northern latitudes, this chart is suitable for late November at 9 p.m. or early December at 8 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Relative sizes and distances in the sky can be deceiving. For instance, 360 "full moons" can be placed side by side, extending from horizon to horizon.

→ • Relative size of the full moon.

Navigating the December night sky: Simply start with what you know or with what you can easily find.

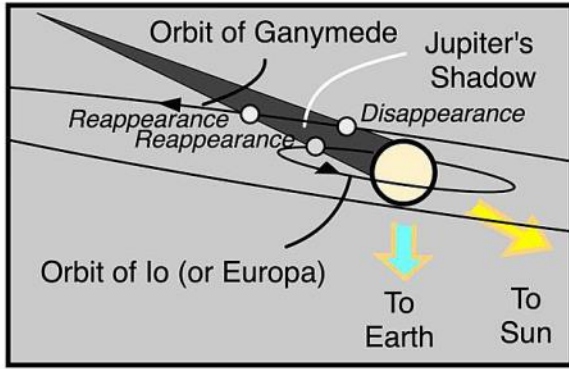
- 1 Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.
- 2 Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."
- 3 Locate Vega and Deneb, the other two stars of the "Summer Triangle." Vega is its brightest member while Deneb sits in the middle of the Milky Way.
- 4 Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

- A and B:** Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
- C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
- D:** Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.



Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.



Galilean moon emergence
(Elapsed time varies with moon)

Elapsed time: 30 sec.

Elapsed time: 2 min.

Elapsed time: 4 min.



An "Oh! Wow!" moment through your telescope

Imagine seeing a world emerge in the darkness, taking several minutes to fully appear. Such a body is Io, Europa, or Ganymede on multiple occasions this December.

Aim a telescope at Jupiter shining in the south a few minutes before the event is predicted to take place. Look away from the planet's bright disk, about one planet diameter from its eastern edge. At the designated time, a faint speck can be discerned. As the seconds pass, that speck grows brighter and brighter.

This is one of the large Galilean moons, slowly leaving Jupiter's shadow while orbiting the giant planet. December is a good month this year to witness an event like this in the evening sky, because Jupiter's shadow angles to the east of the planet, putting the emerging moon relatively far from the planet's glare. Each moon takes a different time to fully emerge, because of its diameter and of its orbital velocity around the planet.

Note: December 12 and 19 have Ganymede disappearing into the shadow and reappearing. December 21 and 28 have Io and Europa both disappearing near the same time.

Make sure that Jupiter is sufficiently above the horizon at your location and that the evening twilight has sufficiently darkened. Begin viewing a few minutes before the listed times.

Event commencement: (all times CST)

| | |
|----------|--|
| Io | Dec 5, 11:34 pm |
| Io | Dec 7, 6:04 pm |
| Ganymede | Dec 12, disappearance 5:41 pm, reappearance 7:48 pm |
| Io | Dec 13, 1:30 am |
| Europa | Dec 14, 6:24 pm |
| Io | Dec 14, 7:58 pm |
| Ganymede | Dec 19, disappearance 9:45 pm, reappearance 11:49 pm |
| { Europa | Dec 21, 9:03 pm |
| { Io | Dec 21, 9:53 pm |
| { Europa | Dec 28, 11:42 pm |
| { Io | Dec 28, 11:48 pm |
| Io | Dec 30, 6:18 pm |

Use a "high" magnification!

What's Up, Doc? †

December 2023

Aaron B. Clevenson, Observatory Director, Insuperity Observatory

This document tells you what objects are visible this next month for many of the Astronomical League Observing Programs. If you are working on one of the more advanced observing programs, then I assume that you are also probably tracking where your objects are all the time. I concentrate on the more common and starter level programs. This information is based on 9 PM Central Time.

Naked-Eye Observing Programs

Meteors – any night, any time, anywhere, the darker the sky the better. The major meteor showers are shown in **BOLD** (times are local time in Houston, TX):

| <u>Shower</u> | <u>Duration</u> | <u>Maximum</u> | <u>Type</u> |
|-----------------|-----------------------|----------------|-----------------|
| Geminids | 12/7 to 12/17 | 12/13 | Major |
| Ursids | 12/17 to 12/26 | 12/22 | Moderate |
| Coma Berenicids | 12/12 to 1/23 | 12/20 | Minor |
| Sigma Hydrids | 12/3 to 12/15 | 12/11 | Minor |
| Monocerotids | 11/27 to 12/17 | 12/8 | Minor |
| Dec Phoenicids | 11/28 to 12/9 | 12/6 | Minor |
| Puppids/Velids | 12/1 to 12/15 | 12/6 | Minor |

Constellations, Northern Skies – any night, any time, anywhere, the darker the sky the better.

Last Chance this cycle: Hercules, Scutum, Aquila, Microscopium.

Transit: Cepheus, Cassiopeia, Andromeda, Pegasus, Pisces, Aquarius, Cetus, Phoenix, Sculptor.

New arrivals: Auriga, Taurus, Orion, Eridanus, Fornax, Phoenix.

Binocular Observing Programs

Binocular Messier – Monthly highlights include:

Easy – 2, 15, 27, 29, 31, 34, 35, 36, 37, 38, 39, 42, 45, 50, 52, 103.

Medium – 30, 33, 78, 79, 81, 82.

Hard – 1, 32, 56, 71.

Big Binoculars – 72, 77, 110.

Deep Sky Binocular – Monthly highlights include:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 38, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60.

Other Observing Programs

Messier

In addition to those listed under Binocular Messier, check out: 43, 57, 74, 76.

Caldwell

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 30, 31, 33, 34, 37, 39, 41, 42, 43, 44, 46, 47, 49, 50, 51, 55, 56, 57, 62, 63, 65, 67, 70, 72.

Double Star

2, 3, 5, 6, 7, 8, 10, 13, 16, 19, 21, 23, 24, 27, 28, 30, 31, 33, 34, 36, 38, 42, 44, 46, 47, 48, 49, 50, 53, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 88, 89, 90, 95.

Other Observing Programs (continued)

Planetary – These are the tasks that can be done this month:

Mercury, Venus, Mars, and Ceres are not visible in the evening sky.

Sun – Any clear day is a good time to get those sunspots. Sunset is 1723 at mid-month.

Moon: The Maria requirement can be done any time the moon is visible. Look after 12/19 and before 12/5 for the best views.

The Highlands requirement can be done at the same time.

The Crater Ages requirement is best done on 12/18 and 12/19.

The Scarps requirement is best done on 12/20.

Occultations occur all the time, the bright ones can be found on the internet. Objects disappear on the East side of the moon.

Asteroids – Course Plotting and Measuring Movement requirements can be done at any time on any asteroid. See above to identify the bright ones this month.

Jupiter is in Aries and is up all evening mid-month.

Saturn is in Aquarius and sets at 2348 mid-month.

Uranus is in Aries and is up all evening mid-month.

Neptune is in Pisces and is up all evening mid-month.

Pluto, the Dwarf Planet, is in Sagittarius and sets at 2111 mid-month.

Lunar

New Moon – 12/12 at 0623 ST

Key timings are indicated below:

4 days, 12/16 7 days, 12/19 10 days, 12/22 14 days, 12/26

Old moon in new moons arms – before 0623 ST on 12/15, 10 % illuminated. (72 hr > New)

New moon in old moons arms – after 0623 ST on 12/9, 10 % illuminated. (72 hr < New)

Waxing Crescent – before 0623 ST on 12/14, 3 % illuminated. (40 hr > New)

Waning Crescent – after 0623 ST on 12/10, 3 % illuminated. (48 hr < New)

Other Astronomical Events this month:

12/2 – Phoenicids Meteor Shower

12/4 – Mercury at Greatest Elongation

12/6 – Neptune Stationary

12/7 – Puppis-Velids Meteor Shower

12/8 – Mercury Dichotomy

12/9 – Sigma Hybrids Meteor Shower

12/9 – Monocerotids Meteor Shower

12/12 – Mercury Stationary

12/14 – Geminids Meteor Shower

12/16 – Coma Berenicids Meteor Shower

12/17 – Neptune at Eastern Quadrature

12/22 – Ursids Meteor Shower

12/31 – Jupiter Stationary

* - Although these clubs are not detailed in this “**What’s Up Doc?**” handout, you can get information on many of their objects by using the “**What’s Up Tonight, Doc?**” spreadsheet (version 4.1). To get your copy, talk to the Doc, Aaron Clevenson, by sending an email to aaron@clevenson.org. It is also available on the club website.

† - “What’s Up Doc?” is used with permission from Warner Bros. Entertainment Inc.

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Inspireity Observatory, 2505 S. Houston Avenue, Humble, TX: www.humbleisd.net/observatory



Auburn Astronomical Society

Application for Membership

To insure that our records are accurate, please print information clearly

Name: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____ Date of Application: ____/____/____

E-Mail: _____

Telescopes owned (if any): _____

Area(s) of special interest: _____

Enclose \$20.00 for regular annual membership, payable in January. *Full-time* student membership is \$10.00.

For **NEW** members joining after January, refer to the prorated dues table below for the month you are joining:

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| Jan \$20.00 | Feb \$18.33 | Mar \$16.66 | Apr \$14.99 | May \$13.33 | Jun \$11.66 |
| Jul \$10.00 | Aug \$8.33 | Sep \$6.66 | Oct \$4.99 | Nov \$2.33 | Dec \$1.66 |

New—Just Joining

Renewal

Please make checks payable to: Auburn Astronomical Society and return this application with your payment to:

Auburn Astronomical Society
c/o John Wingard, Sec/Treasurer
5 Wexton Ct.
Columbus, GA 31907

Note: At this time we do not have an option for online payment of dues.

The Auburn Astronomical Society is a member of the Astronomical League, the national organization representing astronomy clubs throughout the United States. As a club benefit, paid members of the Auburn Astronomical Society are eligible to received quarterly issues of *The Reflector*, the official publication of the Astronomical League. It will be mailed to the address that you provided above but could be delayed somewhat until their mailing lists are updated.

For additional information about our club, please go to our website www.auburnastro.org . You can also follow us on our Facebook page. Just search for "Auburn Astronomical Society."