



# ASTROFILES

## Auburn Astronomical Society Newsletter

November 2020

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### Moon Phases

November 21 — First Quarter  
November 30 — Full Moon  
December 7 — Last Quarter  
December 14 — New Moon  
December 21 — First Quarter  
December 29 — Full Moon  
January 6 — Last Quarter  
January 13 — New Moon

### Latest News and Events

As the end of 2020 draws near, I'm sure that many of us will be glad to see it go. This has been a year that we'll never forget and many aspects of our daily lives may never really be the same again. We hope that all of our members and their families have safely weathered the pandemic so far and will continue to do so. There is hope that the vaccines that are forthcoming will ultimately bring an end to it. As far as our astronomical interests are concerned, the onset of winter brings with it generally clearer skies and more hours of darkness in the earlier parts of the evenings, so it is a good time to get those scopes out and take in many of the wonders of the winter skies. One of the major events occurring in December will be the conjunction of Jupiter and Saturn on December 21st. At that time the two planets will be only 0.1 degrees apart, or about 1/5 the width of the full moon. This will be the closest Jupiter-Saturn conjunction since 1623 and will not be matched again until March 15, 2080. You will need a good, unobstructed view to the Southwest for viewing this event. Additional information about this is can be found later in this newsletter.

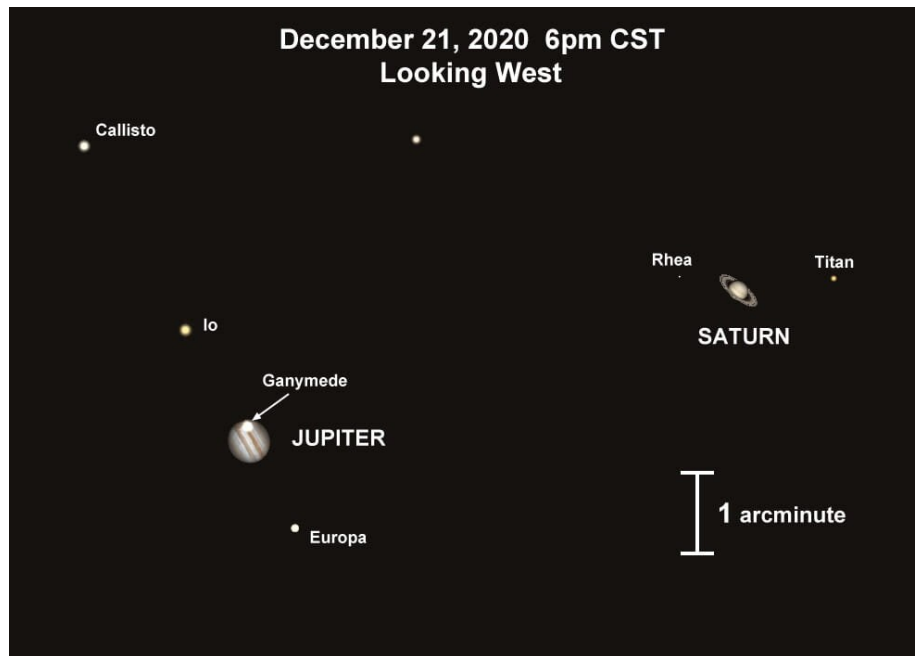
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# Famed Arecibo telescope, on the brink of collapse, will be dismantled

By Daniel Clery - [SCIENCE Magazine](#) Nov. 19, 2020 , 11:30 AM

The Arecibo telescope's long and productive life has come to an end. The National Science Foundation (NSF) announced today it will decommission the iconic radio telescope in Puerto Rico following two cable breaks in recent months that have brought the structure to near collapse. The 57-year-old observatory, a survivor of numerous hurricanes and earthquakes, is now in such a fragile state that attempting repairs would put staff and workers in danger. "This decision was not an easy one to make," Sean Jones, NSF's assistant director for mathematical and physical sciences, said at a news briefing today. "We understand how much Arecibo means to [the research] community and to Puerto Rico."

Ralph Gaume, director of NSF's astronomy division, said at the briefing the agency wants to preserve other instruments at the site, as well as the visitor and outreach center. But they are under threat if the telescope structure collapses. That would bring the 900-ton instrument platform, suspended 137 meters above the 305-meter-wide dish, crashing down. Flailing cables could damage other buildings on the site, as could the three support towers if they fell, too. "There is a serious risk of an unexpected and uncontrolled collapse," Gaume said. "A controlled decommissioning gives us the opportunity to preserve valuable assets that the observatory has."

Over the next few weeks, engineering firms will develop a plan for a controlled dismantling. It may involve releasing the platform from its cables explosively and letting it fall.

The Arecibo telescope has been widely used by astrophysicists as well as atmospheric and planetary scientists since the early 1960s. For many years it was the main instrument involved in listening for messages from extraterrestrial civilizations, and its striking looks won it a supporting role in feature films.

The observatory has been battered by the elements over the years, most recently by Hurricane Maria in 2017 and an earthquake and aftershocks in December 2019. It's unknown whether those stresses contributed to the cable failures, the first of which occurred on 10 August. An auxiliary cable, installed in the 1990s when 300 tons of new instruments were added to the suspended platform, broke away from its socket at one end, damaging some instruments and gashing the surface of the dish below.

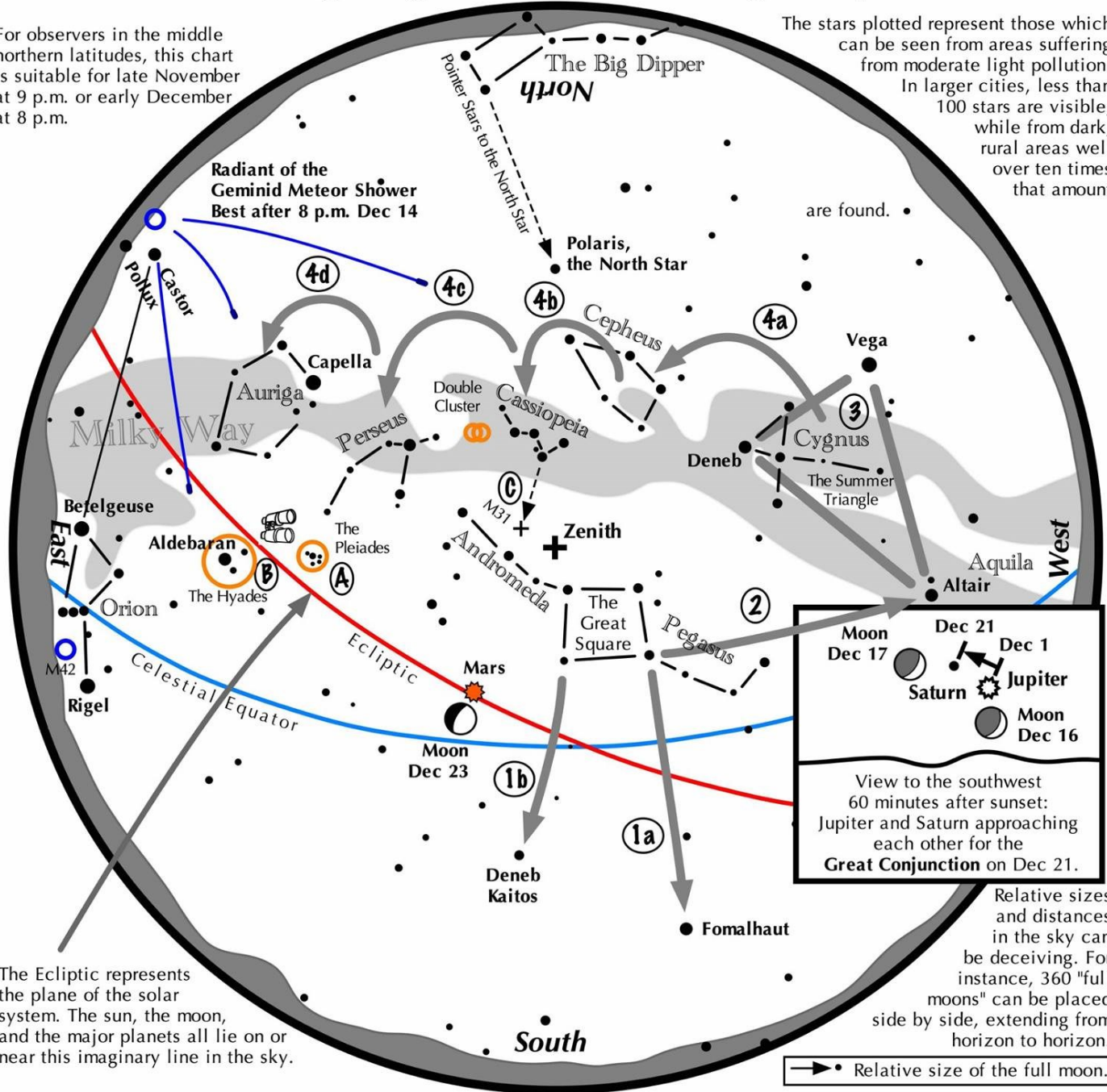




# Navigating the December Night Sky

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.

Moon Dec 17

Dec 21

Dec 1

Saturn

Jupiter

Moon Dec 16

View to the southwest  
60 minutes after sunset:  
Jupiter and Saturn approaching  
each other for the  
**Great Conjunction** on Dec 21.

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.

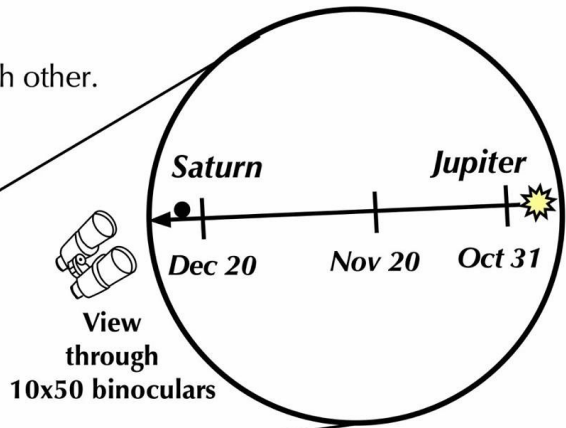
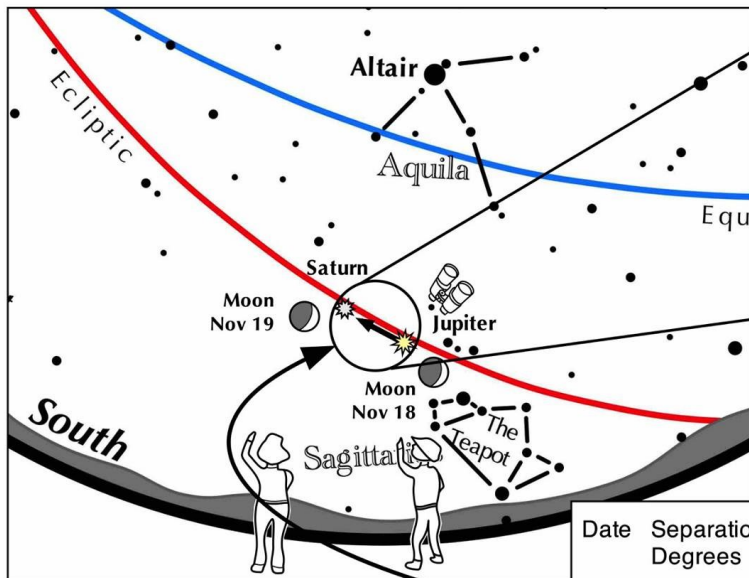
**C:** The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

**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.



# A rare event coming your way!

Once every 19 3/4 years, Jupiter and Saturn approach each other.  
This will be their closest in 397 years!



## Jupiter approaches Saturn

Look to the southwest 60 minutes after sunset throughout November and into December.

- Low in the southwest shine Jupiter and Saturn, the solar system's two largest planets.
- Over the next seven weeks, Jupiter inches eastward toward Saturn as they both sink towards the set sun.
- Hold up your index finger on your fully outstretched arm. Its angular width is about 2°.
- As the nights pass, how many "fingers" can be placed between the two planets? By Nov. 10, just 2, and by Nov. 30, only 1.
- On December 21, the planets appear to merge into a single bright object. Binoculars and a telescope will separate them at that time.

Southwest 60 minutes  
after sunset

Date	Separation Degrees	Index Fingers
Oct 31	5° 11'	2.6
Nov 5	4° 44'	2.3
Nov 10	4° 17'	2.1
Nov 15	3° 47'	1.9
Nov 20	3° 23'	1.7
Nov 25	2° 47'	1.4
Nov 30	2° 16'	1.1
Dec 5	1° 44'	0.9
Dec 10	1° 12'	0.6
Dec 15	0° 39'	0.3
Dec 21	0° 06'	0.0

Angular width of  
index finger on an  
outstretched arm = 2°  
(1 fist-width = 10°)





**This article is distributed by NASA Night Sky Network**

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](http://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

### **Visitors to Both Jupiter and Saturn**

David Prosper

Have you observed Jupiter and Saturn moving closer to each other over the past few months? On December 21, the two worlds will be at their closest, around 1/5 of a full Moon apart! While the two gas giants may *appear* close, in reality they are hundreds of millions of miles apart. Despite this vast distance, a select few missions have visited both worlds by using a gravity assist from giant Jupiter to slingshot them towards Saturn, saving time and fuel.

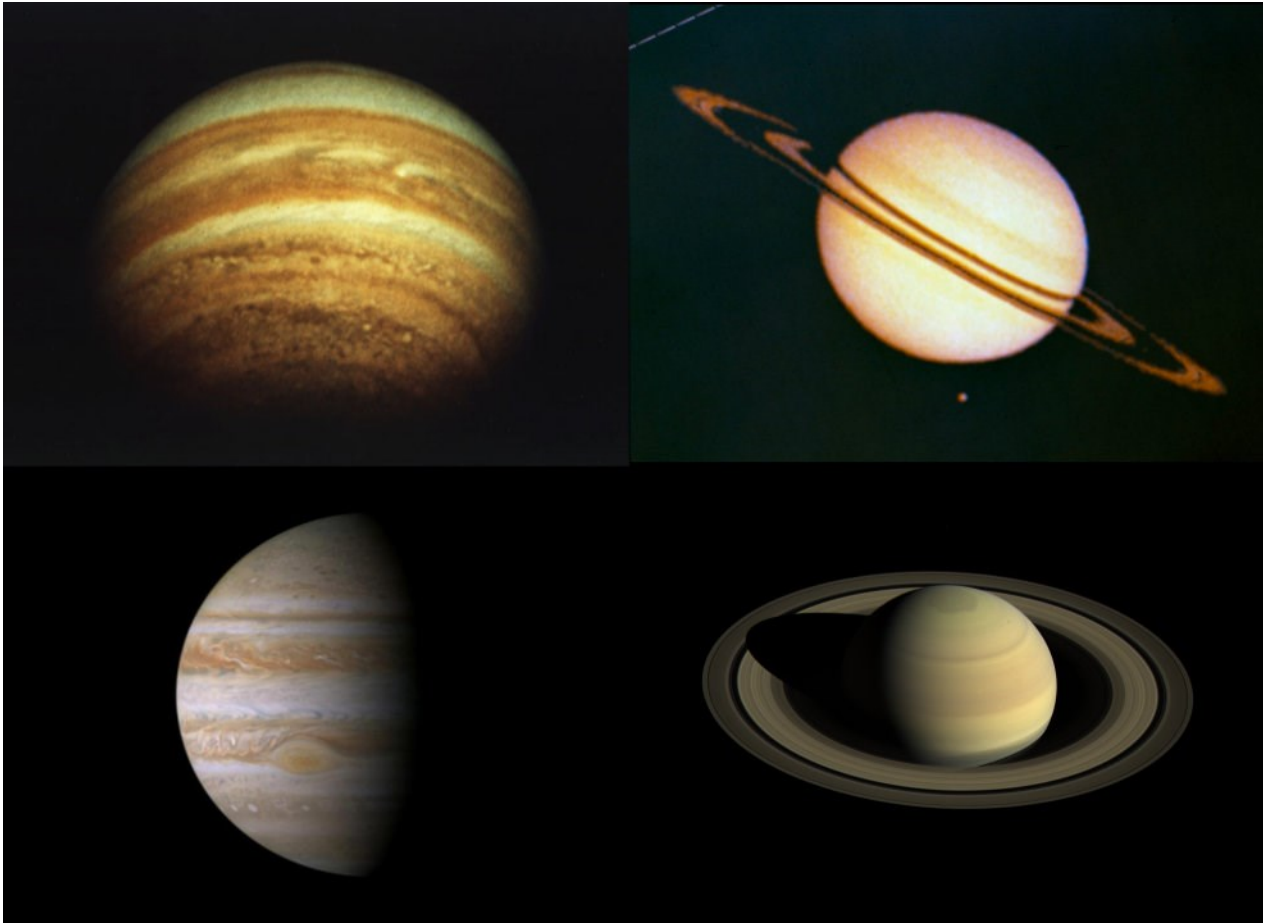
Pioneer 11 was the first mission to visit both worlds! Launched in 1973, the probe flew past Jupiter in late 1974, passing just 26,400 miles above its stormy clouds. In 1979, it became the first spacecraft to encounter Saturn. Pioneer 11 took the first up-close photos of Saturn and its satellites, and made many exciting discoveries, including the detections of its magnetic field and a faint “F” ring, before departing Saturn and eventually, the solar system.

The Voyager missions quickly followed up, taking a “Grand Tour” of the four largest and most distant planets in our solar system. Both probes were launched within two weeks of each other in 1977. Voyager 1 flew past Jupiter in March 1979, discovering Jupiter’s faint ring and two new moons, along with active volcanoes on Io’s surface! The probe then flew past Saturn in November 1980, discovering five new moons, a new “G” ring, mysterious ring “spokes,” and “shepherd moons” shaping the rings. After a brief encounter with Titan revealed evidence of complex organic chemistry and liquid on the moon’s frigid surface, Voyager 1 was flung out of the plane of the solar system. Following close behind, Voyager 2 took detailed photos of Jupiter’s moons and cloud tops in July 1979. Flying past Saturn in August 1981, Voyager 2 measured the thickness of Saturn’s rings and took detailed photos of many of its moons. This second explorer then captured images of Uranus and Neptune before leaving our solar system.

Cassini-Huygens was the last mission to visit both worlds. Launched in 1997, the mission flew past Jupiter in late 2000 and took incredibly detailed photos of its stormy atmosphere and faint rings. Cassini entered into Saturn’s orbit on July 1, 2004. The Huygens probe separated from Cassini, landing on Titan to become the first probe in the outer solar system. Cassini discovered geysers on Enceladus, fine details in Saturn’s rings, many more moons and “moonlets,” the changing oceans of Titan, and seasonal changes on Saturn itself. After revolutionizing our understanding of the Saturnian system, Cassini’s mission ended with a fiery plunge into its atmosphere on September 15, 2017.

What’s next for the exploration of the outer worlds of our solar system? While Juno is currently in orbit around Jupiter, there are more missions in development to study the moons of Jupiter and Saturn. Discover more about future NASA missions to the outer worlds of our solar system at [nasa.gov](http://nasa.gov).





*The difference in technology between generations of space probes can be stunning! The top two photos of Jupiter and Saturn were taken by Pioneer 11 in 1974 (Jupiter) and 1979 (Saturn); the bottom two were taken by Cassini in 2000 (Jupiter) and 2016 (Saturn). What kinds of photos await us from future generations of deep space explorers?*



## Auburn Astronomical Society Membership Application Form

Name:

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Address:

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City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Date of Application\* \_\_\_\_/\_\_\_\_/\_\_\_\_

E-mail:

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Telescope(s):

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Area(s) of special interest:

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Enclose: \$20.00 for regular membership, payable in January. *Full-Time* student membership is half the Regular rate.

If you are a NEW member joining after the first of the year, refer to the prorated table below

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

Make checks payable to: Auburn Astronomical Society and return this application to:

Auburn Astronomical Society  
c/o John Wingard, Secretary/Treasurer  
#5 Wexton Court  
Columbus, GA 31907

For questions about your dues or membership status, contact: [jwin1048@gmail.com](mailto:jwin1048@gmail.com)

**Thank you for supporting the Auburn Astronomical Society!**