Volume 52 Number 5 May 2026

The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence

Coming Events

Monthly Meeting
No Meeting This Month
Baker Wetlands Discovery Center

Public Observing
No Public Observing
Baker Wetlands Discovery Center

Club Officers
President
Rick Heschmeyer email

NSN Coordinator
Howard Edin email

Faculty Advisor
Dr. Jennifer Delgado email.

Newsletter Editor
Chuck Wehner email

Inside This Issue

Report From the Officers

By Rick Heschmeyer

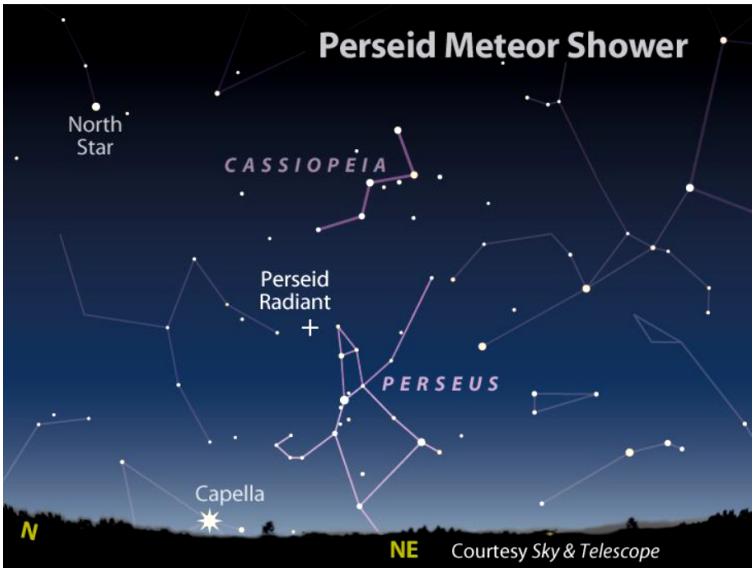
Our April Club Meeting on April 26 featured a talk by KU Graduate student Rachel Cionitti titled "How do Astronomers Compete for Space-Time?" where she discussed the process of applying for, and being awarded, observing time on the James Webb Space Telescope for research. Unfortunately, severe weather that day and evening forced the public observing after the meeting to be cancelled. This was the final club meeting until we meet again in the fall with our August 30 meeting.

The final KU Astronomy Public night of the spring semester will take place on Thursday, May 7, outside of Slawson Hall on the KU campus. Planetarium shows start at 7:30, 8:00, and 8:30 pm. Stargazing and telescopes will follow after the shows as conditions allow.

For summer programs, we have applied to participate in the Lawrence Public Library How-To Festival on Saturday, June 6 from 11am-3pm. If approved, we will be conducting safe solar observing as we have done in the past. I will let everyone know as soon as I hear back from the library.

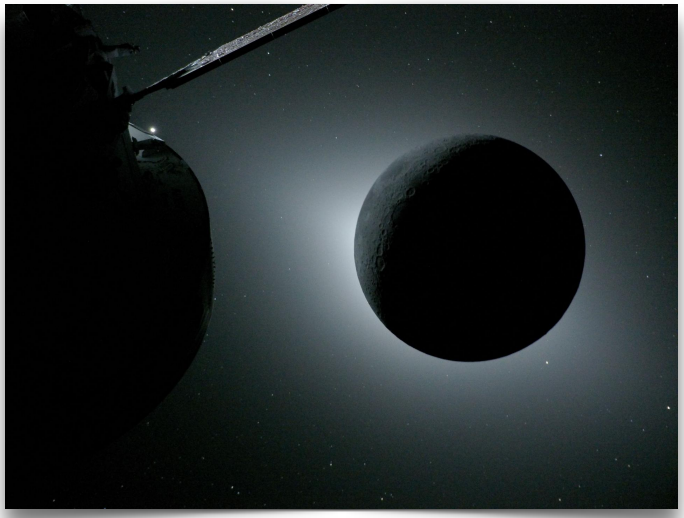
Also on the books for this summer are two events at the KU Field Station. The first is scheduled for Wednesday, August 12 and will coincide with the peak of the Perseid Meteor Shower. The second will take place on Thursday, August 27 for the Partial Lunar Eclipse. Both events are scheduled to start at 9pm. More information will be sent out as we get closer to the dates. While these are the scheduled events for summer, we will let everyone know if new events are added.

Have a great summer and Clear Skies!



NASA's Artemis II Crew Beams Official Moon Flyby Photos to Earth

By Jessica Taveau
NASA, April 7, 2026



The Moon, backlit by the Sun during a solar eclipse, is photographed by NASA's Orion spacecraft on Monday, April 6, 2026, during the Artemis II mission. Orion is visible in the foreground on the left. Earth is reflecting sunlight at the left edge of the Moon, which is slightly brighter than the rest of the disk. The bright spot visible just below the Moon's bottom right edge is Saturn. Beyond that, the bright spot at the right edge of the image is Mars.

The first flyby images of the Moon captured by NASA's Artemis II astronauts during their historic test flight reveal some regions no human has seen, including a rare in-space solar eclipse. Released Tuesday, astronauts captured the images April 6 during the mission's seven-hour flyby of the lunar far side, showing humanity's return to the Moon's vicinity and opening a trove of scientific data.

NASA astronauts Reid Wiseman, Victor Glover, Christina Koch, and CSA (Canadian Space Agency) astronaut Jeremy Hansen, have used a fleet of cameras to take thousands of photos. The agency released several images, with more expected in the coming days as the crew members are more than halfway through their journey and now headed home toward Earth.

"Our four Artemis II astronauts — Reid, Victor, Christina, and Jeremy — took humanity on an incredible journey around the Moon and brought back images so exquisite and brimming with science, they will inspire generations to come," said Dr. Nicky Fox, associate administrator, Science Mission Directorate, NASA Headquarters in Washington.

During the lunar flyby, the crew documented impact craters, ancient lava flows, and surface fractures that will help scientists study the Moon's geologic evolution. They monitored color, brightness, and texture differences across the terrain, observed an earthset and earthrise, and captured solar-eclipse views of the Sun's corona. The crew also reported six meteoroid impact flashes on the darkened lunar surface.

Scientists already are analyzing the downlinked images, audio, and data to refine the timing and locations of these events and compare them with observations from amateur astronomers. The new imagery also will help NASA better understand the Moon's geology and inform future exploration and science missions that will lay the foundation for an enduring presence on the Moon ahead of future astronaut missions to Mars.

"It was remarkable listening to the crew describe the stunning views during the flyby," said Jacob Bleacher, NASA's chief exploration scientist at the agency's headquarters. "At first, their descriptions didn't quite match what we were seeing on our screens. Now that

Earthset captured through the Orion spacecraft window at 6:41 p.m. EDT, April 6, 2026, during the Artemis II crew's flyby of the Moon. A muted blue Earth with bright white clouds sets behind the cratered lunar surface. The dark portion of Earth is experiencing nighttime. On Earth's day side, swirling clouds are visible over the Australia and Oceania region. In the foreground, Ohm crater has terraced edges and a flat floor interrupted by central peaks—formed when the surface rebounded upward during the impact that created the crater.

higher resolution images are coming down, we can finally experience the moments they were trying to share and truly appreciate the scientific return provided by these images and our other research on this mission." ☀

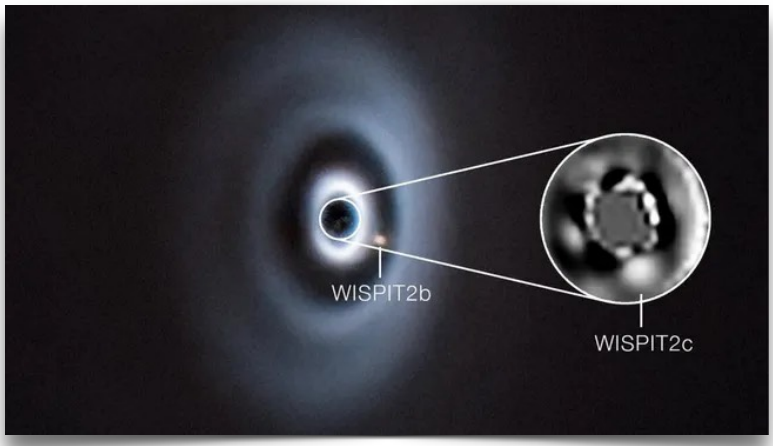
Scientists discover mirror of our solar system in 2 exoplanets forming around a star

By Robert Lea

SPACE.COM, MARCH 24, 2026

"WISPIT 2 is the best look into our own past that we have to date."

Astronomers have observed two planets forming around a distant infant star, thus discovering a planetary system that offers us a look at the appearance of the solar system over 4 billion years ago.



The young star WISPIT 2 as seen by the VLT with two forming protoplanets indicated.

The infant star in question is named WISPIT 2, and it's located around 437 light-years away with an estimated age of around 5.4 million years old. If that makes this star sound anything but an infant, consider that our middle-aged star, the sun, is 4.6 billion years old.

WISPIT 2 is surrounded by a donut-shaped cloud of gas and dust called a protoplanetary disk in which scientists have now detected two planets, designated WISPIT 2b and WISPIT 2c. And excitingly, there are structural hints with WISPIT 2's protoplanetary disk of more forming protoplanets. "WISPIT 2 is the best look into our own past that we have to date," discovery team leader Chloe Lawlor of the University of Galway, Ireland, said in a statement. "These structures suggest that more planets are currently forming, which we will eventually detect."

WISPIT 2 is only the second system in which astronomers have successfully detected two forming planets. The other system, PDS 70, lacks the extended disk and the distinct gaps and bands seen around WISPIT 2. That means that this system offers an unparalleled look at how planetary systems like our own solar system are formed.

"WISPIT 2 gives us a critical laboratory not just to observe the formation of a single planet but an entire planetary system," team member Christian Ginski of the University of Galway said in the statement.

The discovery history of WISPIT 2

WISPIT 2b was the first infant planet discovered around this infant star, detected last year and determined to have a mass around five times that of Jupiter and orbiting its parent star at a distance equivalent to 60 times the distance between Earth and the sun.

Following this discovery, astronomers found hints of an additional object closer to WISPIT 2, confirming this to be a planet using the Very Large Telescope (VLT) and the VLT Interferometer (VLTI). The newly found planet, WISPIT 2c, orbits its parent star at around 15 times the distance between Earth and the sun, meaning it's about four times closer to its star than WISPIT 2b is.

The researchers then captured an image of this forming planet using the VLT's Spectro-Polarimetric High-Contrast Exoplanet Research (SPHERE) instrument, further confirming it is a planet with another VLT instrument, GRAVITY+.

"Critically, our study made use of the recent upgrade to GRAVITY+ without which we would not have been able to get such a clear detection of the planet so close to its star," team member Guillaume Bourdarot of the Max Planck Institute for Extraterrestrial Physics in Germany said in the statement.

Both WISPIT 2b and WISPIT 2c are carving grooves in the protoplanetary disk around their parent star. This is happening because, as they orbit the star, their gravitational influences collect material from the disk to facilitate their growth.

At least one more planet is indicated in the system by a less-pronounced gap —further out from the system's central star than WISPIT 2b sits. The team

hopes this third planet will be visible with the Extremely Large Telescope (ELT), currently under construction in the Atacama Desert region of northern Chile.

"We suspect there may be a third planet carving out this gap, potentially of Saturn's mass, owing to the gap's being much narrower and shallower," Lawlor said. ☀

Smart Telescopes

Sky and Telescope

Smart telescopes offer ease of use and quick setup, making astronomy accessible for beginners through automated pointing and live stacking that reveals faint deep-sky objects quickly, even in light-polluted areas, allowing for easy image capture, processing, and sharing without complex traditional equipment. Key benefits include beginner-friendliness, portable all-in-one design, and the ability to produce stunning images from your backyard by overcoming typical barriers to entry.

Key Benefits

Beginner-Friendly & Fast Setup: Fully automated systems with intuitive apps mean you can set up and start viewing deep-sky objects in minutes, reducing frustration.

Enhanced Imaging in Light Pollution: Built-in filters and live stacking (combining multiple exposures) reveal colors and details of nebulae and galaxies that are impossible to see with the naked eye, even in city skies.

Portability & All-in-One Design: Compact, backpack-friendly, and self-contained units with integrated cameras, mounts, and software, making them perfect for travel and quick outings.

Easy Sharing & Outreach: Instantly share captured images with family, friends, or for educational events, making astronomy a social experience.

Automated Tracking & Processing: The telescope automatically finds, locks onto, and tracks celestial targets, while internal routines handle complex image stacking and correction.

Versatility: Many models offer features like wide-angle lenses for daytime terrestrial shots and filters for specific targets, all controlled via a smartphone app.

Usage Examples

Family Stargazing: Show grandkids vibrant galaxies from your driveway.

Citizen Science: Contribute to astronomy projects by capturing data.

Quick Night Photography: Get impressive shots of the Milky Way or nebulae on a short clear night.

Educational Outreach: Easily demonstrate deep-sky wonders at star parties. In essence, smart telescopes democratize astrophotography and viewing, offering immediate rewards and removing technical barriers to exploring the cosmos. ☀

The world is getting brighter at night but some places are going dark

Nighttime on Earth is getting brighter—but not everywhere, and not for the same reasons.

Sciencedaily, April 9, 2026

Earth's nights are steadily getting brighter overall, but the changes vary dramatically by region. Rapid urban growth is lighting up countries like China and India, while parts of Europe are dimming due to energy-saving efforts and new lighting technologies. The most detailed satellite analysis yet shows these shifts happening faster and more unevenly than expected. Even global trends can mask sharp local contrasts, from war-related blackouts to deliberate reductions in light pollution.

The final accumulated nighttime light change area: A night-time view of Earth, capturing human activity across the eastern hemisphere of the planet through the emissions of artificial light. Derived from satellite images taken daily over the past decade, the image maps the dynamics of the human night-time activity, with golden areas experiencing brightening, purple areas featuring dimming, and white areas experiencing both. Credit: Michala Garrison/NASA Earth Observatory

Satellite observations show that the planet is steadily getting brighter at night, but the trend is far from uniform. Data from the VIIRS DNB instrument, covering 2014 to 2022, indicate that global nighttime lighting has been increasing by roughly two percent each year.

"Although there has been a total increase of 16 percent worldwide, that does not mean that lighting is increasing everywhere," explained Christopher Kyba. "In areas where lighting increased, we found global emissions rose by 34 percent. This was offset by an 18 percent decrease in emissions from other areas."

These findings reveal that changes in nighttime lighting are more dynamic and localized than previously understood. Rapid urban growth made countries like China and India significantly brighter during the study period. In contrast, some industrialized nations saw declines in light emissions, often linked to the adoption of LED technology and policies aimed at reducing light pollution.

Regional Shifts Reflect Policy and Conflict

Not all changes are gradual. Ukraine experienced a sharp drop in nighttime lighting after the Russian invasion. France also saw a major reduction, with nighttime brightness falling by 33 percent as many cities turn off streetlights after midnight to conserve energy and limit light pollution.

"In Germany, light emissions remained almost constant overall despite local variations," Kyba reports. "While light emissions rose by 8.9 percent in brightening German regions, they fell by 9.2 percent in dimming areas."

Across Europe as a whole, satellite measurements show a four percent decrease in nighttime light emissions. However, this decline may not fully match what people perceive on the ground, since the satellite detects light differently than the human eye.

High Resolution Data Reveals Faster Changes

A key advance in this study is the use of full resolution nightly data. Earlier analyses relied on monthly or yearly averages, which made it harder to spot short term or localized changes.

"Until now, no global analysis had been conducted using the full-resolution nighttime data," Kyba emphasizes.

The research team also applied a new algorithm that accounts for the angle at which the satellite views the Earth. For instance, residential neighborhoods tend to appear brighter when seen at an angle, while dense city centers often look brighter from directly overhead. Incorporating these differences allowed for a more accurate picture of how light emissions are changing.

How the Satellites Track Earth at Night

The study is based on data from the Visible Infrared Imaging Radiometer Suite (VIIRS) Day/Night Band (DNB), carried by the Suomi NPP, NOAA-20, and NOAA-21 satellites operated by NOAA and NASA.

These satellites collect images after midnight, usually between 1:00 a.m. and 4:00 a.m. local time, and scan nearly the entire planet each night between 70° North and 60° South. Each pixel in the imagery represents about 0.5 square kilometers.

To ensure accuracy, researchers focused only on artificial light sources. Natural phenomena such as wildfires and auroras, which the satellites can also detect, were excluded from the analysis.

A Push for a Next Generation European Satellite

Understanding how nighttime lighting is changing has practical importance. "Artificial light is a major consumer of electricity at night, and light pollution harms ecosystems," says Christopher Kyba. "It is therefore important to understand how both of these are changing."

Kyba is leading efforts to develop a new satellite designed specifically to monitor night lights, as part of the European Space Agency's (ESA) "Earth Explorer

13" mission. This proposed system would detect much fainter light sources and offer significantly higher resolution, reducing uncertainty about global lighting trends.

"While the U.S. and China each have multiple satellites that observe nighttime light, there is currently no European satellite designed for this purpose," says Kyba. ☀

New Theory Says We've Been Overcomplicating the Big Bang

The lens of quantum physics offers a much simpler view of the Big Bang, research suggests.

By Gayoung Lee
GIZMODO, APRIL 2, 2026

An artist's impression of a pinpoint of light representing the Big Bang in the earliest days of the universe.

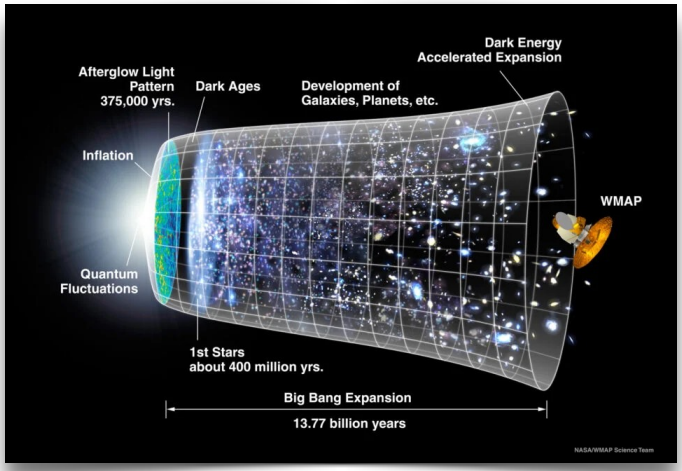
One of the greatest unsolved problems in physics concerns unifying quantum mechanics and general relativity—two equally successful theories that infamously don't get along. And the latest attempt to bridge the pair brings into the equation the explosion that started everything: the Big Bang.

In a recent Physical Review Letters paper, physicists at the University of Waterloo and the Perimeter Institute in Canada propose a new theory that the rapid expansion of the universe in its earliest moments aligns nicely with another model for quantum gravity. According to the team's mathematical predictions, the Big Bang emerges rather naturally from the theory, called quadratic gravity, a revised account of Einstein's standard theory of gravity.

"Think of Einstein raised to the second power," Jerome Quintin, the study's co-author and a theoretical cosmologist, told Gizmodo. The new work "takes formal calculations from quantum field theory and creates a bridge between them and actual cosmological scenarios and observations, which allows us to test these formal, theoretical ideas and calculations."

The universe's early days

The Big Bang refers to that gigantic explosion responsible for setting up the universe to grow into the world we observe today. In the "standard" picture, the universe starts small, hot, dense, and generally homogenous and isotropic, explained Ruolin Liu, the study's lead author and a doctoral student, to Gizmodo.



A representation of the evolution of the universe over 13.77 billion years.

A popular explanation for this phenomenon is called the inflationary scenario, which postulates that the hypothetical inflaton particle drove a "burst of rapid, accelerated expansion" in the earliest days of the universe, Liu said. But this theory breaks down the earlier we go in astronomical time, which corresponds to higher energies in the universe, he added.

Finding a quantum solution

The team wondered if there was a way to explain the Big Bang without tacking on too many new variables. And if quantum effects could somehow enter the equation, that would be even better. They decided on quadratic gravity, which remains mathematically

consistent at very high energy levels like that of the Big Bang, according to the paper.

Fascinatingly, the team's calculations revealed that the quadratic terms of the model organically triggered cosmic expansion, after which the spacetime structure fell into the known effects of general relativity. What's more, Liu added, the study's mathematical predictions fit nicely with observations of the universe made by the latest technologies, which have been "in conflict with more mainstream models of inflation."

A testable hypothesis

Most importantly, the team believes its theory is completely testable—which isn't usually the case for models on quantum gravity. The model predicts a minimum level of gravitational waves generated during inflation, which next-generation detectors will be able to catch.

Niayesh Afshordi, the study's senior author and a physicist, told Gizmodo that quantum gravity is often conveyed as something "purely theoretical," but the new work "shows that quantum gravity can absolutely be studied and bridged to concrete cosmological scenarios, which come with specific predictions that we can test now and in the future as well."

Awaiting the revolution, sort of

Certainly, if the team's results can be validated—both theoretically and empirically—the implications will be nothing short of revolutionary. But as is the case with any prediction, there's not much to say conclusively until the new proposal weathers independent review and experimentation.

That said, it's also true that we're living in a particularly great time for cosmology. For example, LISA, the next-generation detector that could do what the team is looking for, is slated to launch as early as 2035. NASA's Nancy Grace Roman Telescope, after weathering a budgetary storm, will launch as planned. And the young Vera C. Rubin Observatory is bombarding astronomers with hundreds of thousands of observations.

So even if the latest proposal doesn't end up being "the one," we might be entering an era that allows us to drag out the hypothetical into the realm of testable ideas. And that's exciting! ☀

NASA Shuts Off Instrument on Voyager 1 to Keep Spacecraft Operating

JPL, April 17, 2026

On April 17, engineers at NASA's Jet Propulsion Laboratory (JPL) in Southern California sent commands to shut down an instrument aboard Voyager 1 called the Low-energy Charged Particles experiment, or LECP. The nuclear-powered spacecraft is running low on power, and turning off the LECP is considered the best way to keep humanity's first interstellar explorer going.

The LECP has been operating almost without interruption since Voyager 1 launched in 1977 — almost 49 years. It measures low-energy charged particles, including ions, electrons, and cosmic rays originating from our solar system and galaxy. It has provided critical data about the structure of the interstellar medium, detecting pressure fronts and regions of varying particle density in the space beyond our heliosphere. The twin Voyagers are the only spacecraft that are far enough from Earth to provide this information.

The choice of which instrument to turn off next wasn't made in the heat of the moment. Years ago, the Voyager science and engineering teams sat down together and agreed on the order in which they would shut off parts of the spacecraft while ensuring the mission can continue to conduct its unique science. Of the 10 identical sets of instruments that each spacecraft carries, seven have been shut off so far. For Voyager 1, the LECP was next on that list. The team shut off the LECP on Voyager 2 in March 2025. ☀

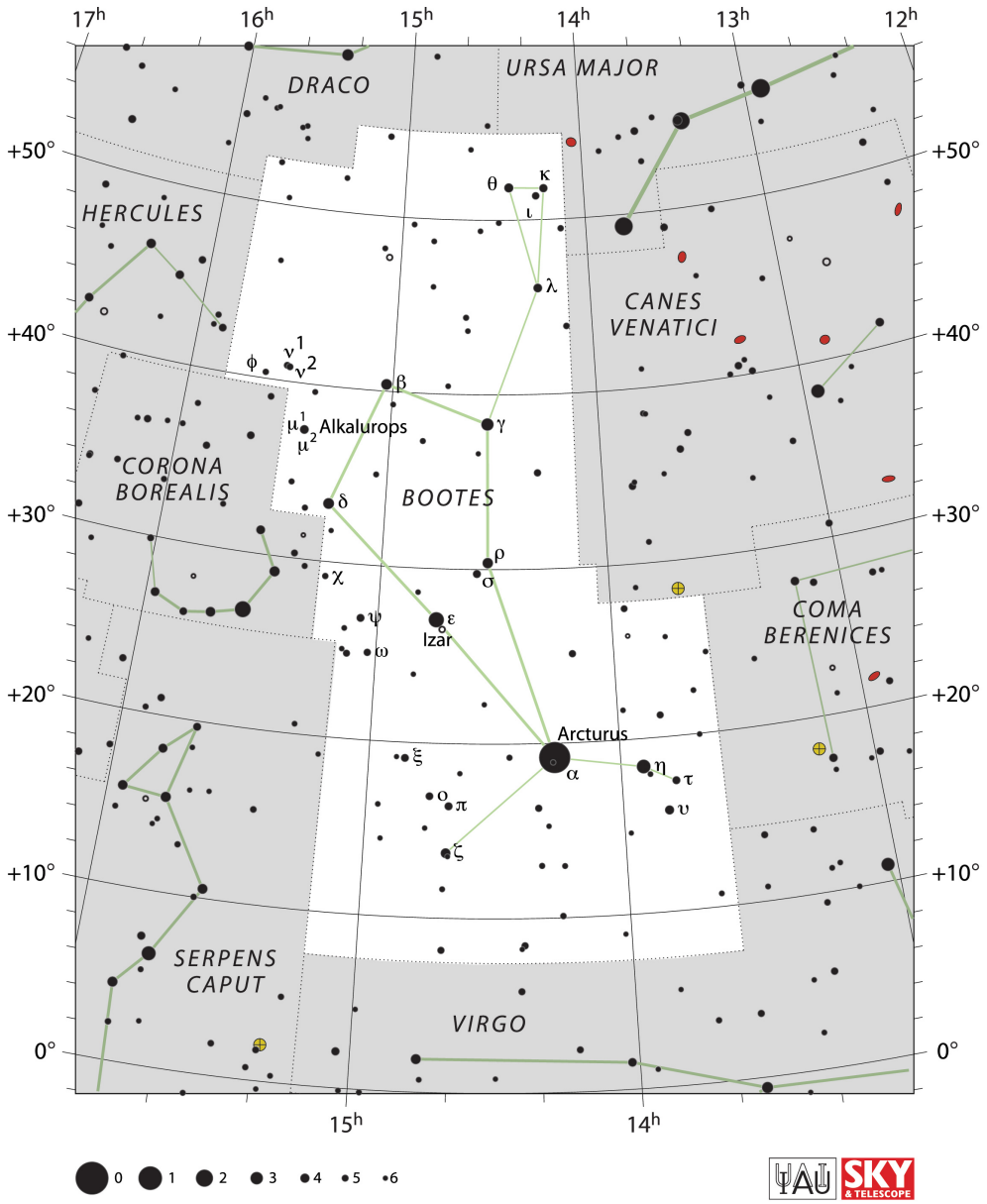
The Backyard Observer, May 2026

By Rick Heshmeyer

Boötes

In the spring many celestial observers think of viewing galaxies and little else. But in their zeal to observe the spring bounty of “island universes" they often ignore other delights of the night sky. This month's constellation, BOOTES. the Herdsman, is one of those oft-ignored areas of the spring sky. As well as being the home of the brightest star north of the Celestial Equator, Arcturus, BOOTES also contains several beautiful and interesting double stars.

Alpha Boötis is a red/orange giant star. Better known by its proper name of Arcturus, it is the 4th brightest star in the sky, and the brightest in the northern half of the celestial dome, shining at an apparent visual magnitude of -0.05. Its name, translated from ancient Greek, means “The Guardian of the Bear.” But the most interesting thing about Arcturus is that, in a way, it is an intruder in our part of the galaxy. Arcturus is a member of a group of around 50 old stars, known as the Arcturus Stream, that occupy an area that surrounds the galaxy, known as the galactic halo. The star itself has a highly inclined orbit that has it presently cutting through the galactic plane very near us. In fact, in a half-million years or so, the 4th brightest star in our sky will be so far away it will be invisible to the naked eye!



EPSILON BOOTIS: Known as Izar, this is one of the most beautiful double stars in the heavens. You'll need a medium-sized telescope to split this close pair, but the view is ample reward. The primary star is a dazzling yellow/gold while the secondary is sometimes described as blue, sometimes as green. You be the judge!

XI BOOTIS: This is one of the nearest of the double stars in the sky, being only 22 light years distant. It was discovered over 200 years ago. Easier to split than Izar, the colors of this double also show fine contrast too ,being yellow and rose.

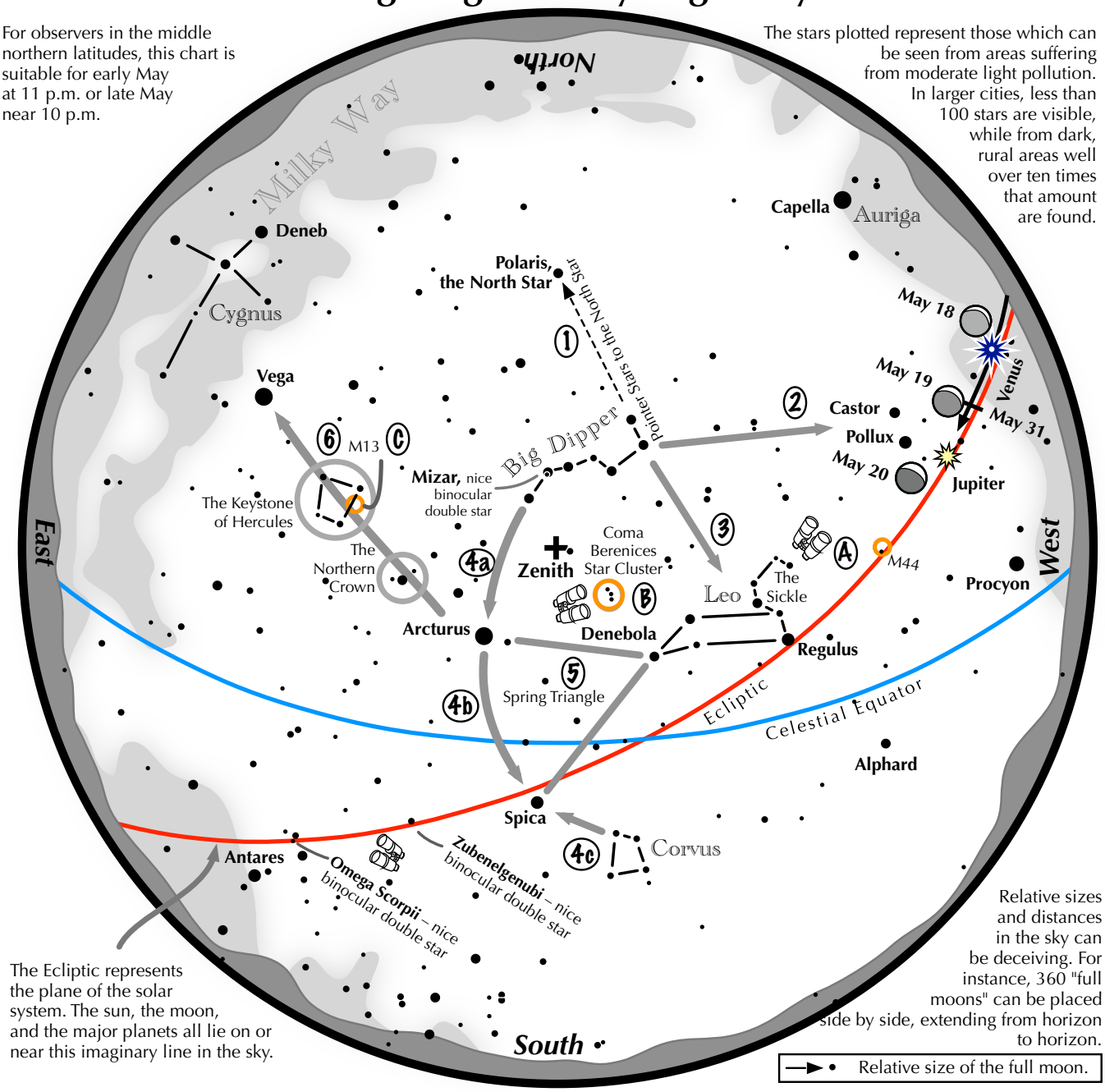
MU BOOTIS: This is a wide pair comprised of white/orange stars, the fainter of which is actually a double star itself.

Feel free to observe galaxies to your heart’s content this spring, but don’t forget there are other treasures in the heavens this time of year as well.

Navigating the May Night Sky 2026

For observers in the middle northern latitudes, this chart is suitable for early May at 11 p.m. or late May near 10 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 May night sky: Simply start with what you know or with what you can easily find.

1. Extend a line northward from the two stars at the tip of the Big Dipper's bowl. It passes by Polaris, the North Star.
2. Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
3. Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
4. Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
   Confirm Spica by noting that two moderately bright stars just to its southwest form a straight line with it.
5. Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.
6. Draw a line from Arcturus to Vega. One-third of the way sits "The Northern Crown." Two-thirds of the way hides the "Keystone of Hercules." A dark sky is needed to see these two dim stellar configurations.

Binocular Highlights
A: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux. **B:** Look near the zenith for the loose star cluster of Coma Berenices. **C:** M13, a round glow from a cluster of over 500,000 stars.

About Astronomy Associates

The club is open to all people interested in sharing their love for astronomy. Monthly meetings are typically on the last Sunday of each month and often feature guest speakers, presentations by club members, and a chance to exchange amateur astronomy tips. These meetings and the public observing sessions that follow are scheduled at the Baker Wetlands Discovery Center, south of Lawrence. All events and meetings are free and open to the public. Periodic star parties are scheduled as well.

Because of the flexibility of the schedule due to holidays and alternate events, it is always best to check the Web site for the exact Sundays when events are scheduled.

Copies of the Celestial Mechanic can also be found on the web at newsletter.
Annual Dues for the club are: $12 for regular members; $6 for students Membership forms can be accessed at the club website form.