Volume 52 Number 11 November 2026

The Celestial Mechanic

The Official Newsletter of the Astronomy Associates of Lawrence

Coming Events

Monthly Meeting
No Meeting in November
Baker Wetlands Discovery Center

Public Observing
No Observing in November
Baker Wetlands Discovery Center

Club Officers

President
Rick Heschmeyer email

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Howard Edin email

Faculty Advisor
Dr. Jennifer Delgado email.

Newsletter Editor
Chuck Wehner email

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Report From the Officers

By Rick Heschmeyer

As we switch back to Standard Time on November 1, and the skies get darker earlier, now is a great time to get outside and look up.

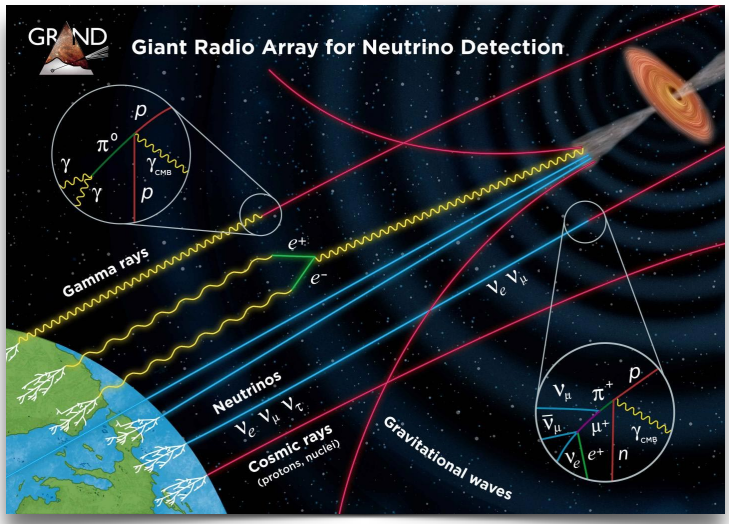
On October 9th on the KU Campus the Physics and Astronomy Department held a groundbreaking ceremony for the new Tombaugh Observatory. The current timeline for the observatory is to open sometime in the late spring of 2027.

On October 17th AAL members Jerelyn and Paul Ramirez and AAL president Rick Heschmeyer and his wife and AAL member Clare Heschmeyer, participated in the Wichita Public Library's Advanced Learning Library DIY Day from 10am-3pm. Jerelyn and Paul teamed up with members from KAO, the Wichita club and ran several astronomy activities for attendees, while Rick and Clare manned a couple of tables sharing their meteorite collection with the public.

Our club meeting on October 25 featured KU Physics 3rd-Year Graduate Student Katie Sherriff presented a very interesting talk entitled "Some Stars Make Terrible Neighbors". She has been involved in various research projects, including an REU (Research Experiences for Undergraduates) at the National Radio Astronomy Observatory. She is studying in the Nearby Galaxies Lab at KU.

The KU Telescope Night for November will take place on Thursday November 12th. Planetarium Shows start at 7:30, 8:00 and 8:30 pm in G174 Slawson. Stargazing and telescopes will take place after the shows as conditions allow.

Our next club meeting will take place on Sunday, December 6th. K.U. Graduate Student and PhD Candidate Sanyukta Agarwal will present "High-Energy Neutrinos and How to Detect Them". The meeting will start at 7 PM at Baker Wetlands Discovery Center, followed by public telescope observing, weather permitting.



Clear Skies!

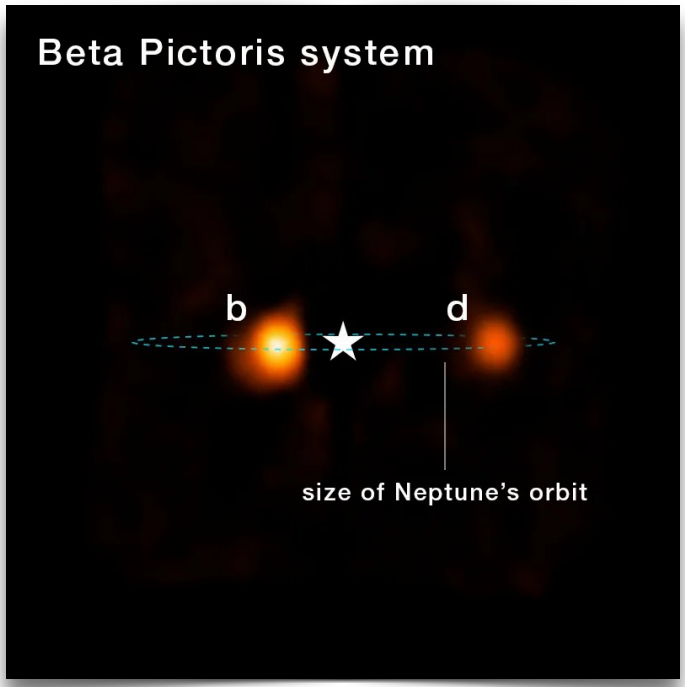
Scientists Detect Radio Signals From an Exoplanet for the First Time in History

No, it's not aliens, but a phenomenon caused by magnetic activity that astronomers have never before been able to pin on a specific planet.

By Jorge Garay

WIRED, SEPTEMBER 24, 2026





The newly discovered third planet orbiting Beta Pictoris, Beta Pictoris d, appeared in reconstructed imagery from NASA's James Webb Space Telescope. Modeling suggests its orbit is comparable to the region occupied by Neptune in our own solar system.

Approximately 63 Light-Years from Earth lies a planetary system so young that it's less than 1 percent as old as our solar system. It is called Beta Pictoris, and—as far as astronomers have confirmed—it consists of a star more massive than the sun, three giant planets, and a huge disk of dust and debris.

The middle planet in the system, Beta Pictoris b, is a gas giant several times more massive than Jupiter. Being a gas giant, it likely does not have a solid surface on which to "land," and at just a few tens of millions of years old, it can be considered a newborn planet in astronomical terms. It's also one of the most extensively studied exoplanets through direct observation. Its youth keeps it hot and bright, and its distance from the star—similar to that between our sun and Saturn—makes it possible to distinguish from the star with sufficiently powerful telescopes.

Now, a new study from researchers at Harvard and the University of Oregon claims that Beta Pictoris b is the source of something that has never before been unequivocally detected on another world: radio emissions

Recorded by the MeerKAT radio telescope in South Africa, the signal is likely of natural origin, as in no, it's not aliens. The authors are quick to note this from the outset of their preprint. And while the study has not yet been peer-reviewed, the authors present sizable evidence to support their interpretation that the source of the broadcast is intense magnetic activity

The characteristics of the radio waves match theoretical predictions for magnetic fields generated by young, massive planets. Charged particles can become trapped in the planet's powerful magnetic field, and as the planet rotates, these particles can accelerate and release energy in the form of radio waves. In a sense, this phenomenon—known as an auroral radio emission—is the planet's magnetosphere "shouting" into space.

The team detected several of these calls and, for the first time, managed to pinpoint their origin directly to an exoplanet—something scientists have been trying to achieve for years.

Astronomers have come close to this achievement a few times in recent years, such as in 2023, when bursts of radio waves were detected in the YZ Ceti system. The signals appeared to repeat in sync with one planet's orbit. However, researchers could not rule out the possibility that those emissions were simply caused by the star's magnetic activity.

The Beta Pictoris system also holds a special place in the history of astronomy. In 1984, Beta Pictoris

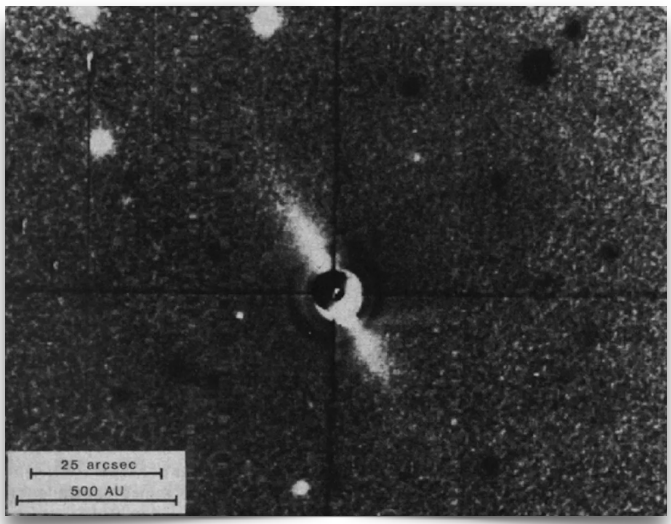


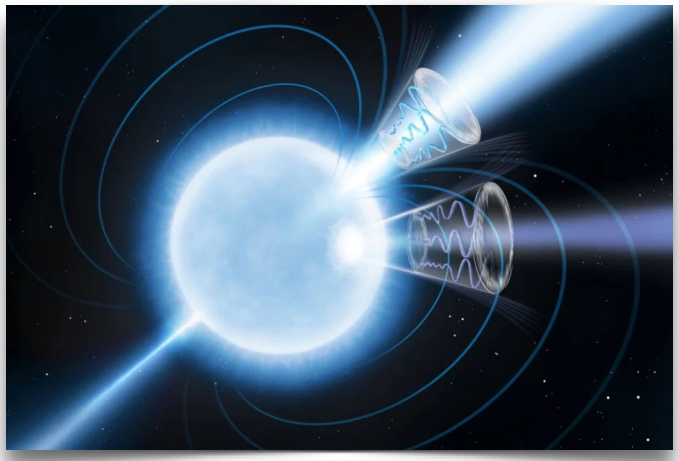
Image of the debris disk around the star Beta Pictoris, taken in 1984. Type to enter text

became the first star around which a disk of dust and debris was directly photographed. That image suggested planet-forming processes might be taking place there, though at that time astronomers were unable to confirm the existence of any planets. ☀

Heisenberg Said Empty Space Isn't Really Empty. A Magnetic Star May Have Finally Proven Him Right

By Gayoung Lee

Gizmodo, AUGUST 17, 2026



An artist's concept of the magnetar 1E 1547.0-5408, a rapidly rotating neutron star with magnetic fields over a trillion times stronger than Earth's

More often than not, anything "quantum" makes you think of stuff on the tiniest of scales. But in reality, quantum phenomena govern everything—including cosmic giants scattered across the universe. And, as proof, astronomers may have just confirmed an old quantum prediction by studying an ultra-magnetic star.

In a recent paper published in Nature, astronomers describe their observations of the star 1E 1547.0-5408. This star happens to be a magnetar—an isolated neutron star with extremely powerful magnetic fields and X-ray emissions. According to the study, 1E 1547.0-5408's magnetic field—over a trillion times stronger than Earth's—appears to be demonstrating a quantum phenomenon called "vacuum birefringence," in which seemingly empty spaces alter the behavior of light. If true, the observation represents the first-ever detection of vacuum birefringence, which was initially predicted by physics pioneers Werner Heisenberg and Hans Euler in the 1930s.

"Detecting vacuum birefringence requires a magnetic field that is over 100 million times stronger than any we've ever made on Earth," explained Marcus Lower, the study's co-author and an astrophysicist at the Swinburne University of Technology in Australia, in a statement. "Thankfully, nature has provided us with magnetars, which are the perfect cosmic laboratories to go looking for this effect."

Giant quantum blips

Vacuum birefringence has been central to Heisenberg's account of quantum electrodynamics, a subfield in quantum physics that describes the relationship between light and matter. According to a NASA statement on the new findings, vacuum birefringence suggests that exceptionally powerful magnetic fields force vacuums—completely empty spaces—to act like a lens or prism, resulting in unusually high levels of polarization.

But for nearly a century, scientists haven't been able to directly prove this actually happens in reality, according to an accompanying News & Views by Ekaterina Sokolova-Lapa and Joern Wilms, both astronomers at the University of Erlangen-Nuremberg who weren't involved in the latest work.

Cosmic laboratories

Enter magnetars. To Physics World, study lead author Rachel Stewart likened these stars to a "natural lab,"

as they are among the most magnetic objects observed in the universe. But 1E 1547.0–5408 in particular had a particularly bright radio and X-ray emission that made it an ideal candidate for studying these phenomena, explained Stewart, a Ph.D. candidate at George Washington University.

The team's hunch was on the mark. For one, the polarization of light detected in the magnetar was three times greater than what's expected from similar sources. Even more strange was the fact that the geometry of the magnetic field indicated certain sections of the field should show zero polarization, but that wasn't the case.

"By carefully tracking the direction the radio waves and X-rays oscillate as the magnetar rotates, [we] found that the alignment of 1E1547's magnetic and rotational poles was ideal for detecting vacuum birefringence," Lower explained in the Swinburne statement. Despite all odds, the powerful magnetic field had pushed "Heisenberg's virtual particles" to follow the direction of the field such that, to an external observer, it looked like a vacuum was twisting the light.

Pending judgment?

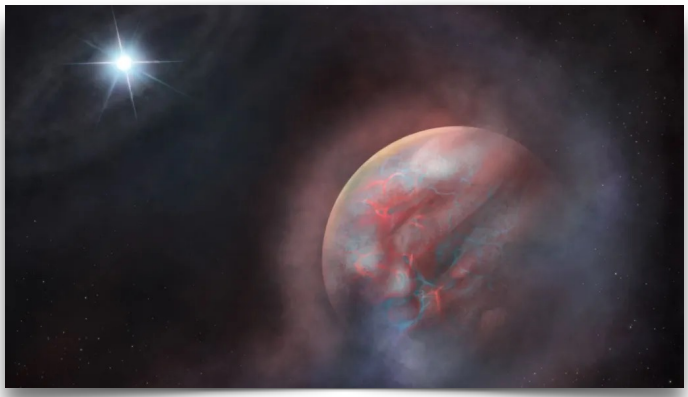
However, experts uninvolved in the work cautioned against taking this observation as solid proof. Sokolova-Lapa and Wilms wrote that the "validity of this interpretation hinges on whether the authors' proposed magnetar geometry is correct," as it's possible that the star's tilt made it seem like the radio and X-ray signals were aligned. It's also unclear currently as to what the radio and X-ray observations exactly are telling us about the true nature of the star, Roberto Taverna, an astronomer at the University of Padova in Italy, told Physics World.

So we'll have to wait for future investigations to confidently declare that Heisenberg and Dirac were correct. Either way, the observations show that quantum laboratories aren't necessarily at the smallest scales.

"This result truly highlights the interdisciplinary power of the field of astrophysics," Stewart said in the NASA release. "The information we obtained from looking at this distant star core also gives us clues about the nature of the fabric of reality as we know it, and I find that to be incredible." ☀

A 'phoenix' planet was born from the ashes of its dead star

The discovery hints that planetary systems can have second beginnings



An evaporating gas giant planet (illustrated) may have formed around a white dwarf after the original star died.

By Lisa Grossman
Sciencenews, October 5, 2026

A dead star's wreckage may be the birthplace of a new planet.

The existence of second-generation planets was predicted theoretically more than 15 years ago. But this "phoenix" world, if confirmed, would be the first actually spotted, scientists report October 5 in Nature Astronomy.

"A phoenix is reborn from the ashes of its predecessor, and this planet is formed from the ashes of the star," says astronomer Jamie Williams, of the University of Warwick in Coventry, England.

The finding suggests planetary systems can have a second life even after their stars die.

Before this discovery, this planet formation process has been "more like a hypothesis, more like speculation," says planetary scientist Zifan Lin of Washington University in St. Louis, who was not involved in the new work. "This is the first time we've seen evidence for that process."

Williams and colleagues found signs of the planet in the atmosphere of a white dwarf called HS 0209+0832. White dwarfs are the small, dense cores left behind after low-mass stars — like our sun — puff

up into red giant stars at the end of their lives, ultimately blowing all the outer material away.

These stellar corpses are so dense that most chemical elements sink into their centers, leaving them with pristine atmospheres composed of almost entirely hydrogen and helium. But astronomers have found that between a quarter and half of these stars are "polluted" with elements like silicon and iron, which are found in rock.

These elements probably come from shattered planets that the star devoured as it expanded. "They can be probes into the interiors of planets," Lin says. Astronomers have also found whole planets that seem to have survived their stars' demise and still orbit the remaining white dwarf. Ironically, some astronomers think these dead stars could be prime hunting grounds for signs of extraterrestrial life.

HS 0209+0832 was a known weirdo. When the Hubble Space Telescope observed it in 1999, astronomers could tell that the white dwarf contained a mysterious mix of chemicals, but they couldn't identify them. Since then, there have been more detailed studies of how certain atoms would show up in stellar atmospheres, Williams says.

Reanalyzing those observations showed that the white dwarf contains only trace amounts of silicon and almost no iron, Williams and colleagues found. But it does include a ridiculous amount of niobium. This hard, silvery metal, used in jewelry, rocket systems and superconductors, is rare on Earth and had never been seen in a white dwarf.

"We've never observed anything in the universe that's this niobium-rich before," Williams says. "We were quite confused at first."

A clue to how it got there came from the element's origins. Niobium forms in the slow neutron-capture process, or s-process, which mostly occurs in certain red giant stars as they shed their atmospheres and die. Iron nuclei transform into heavier elements in a series of accretion and decay that can take thousands of years.

Material ejected from a dying star could have coalesced into a new planet full of s-process elements, Williams says. Then the resulting white dwarf could slowly sip on the new planet's atmosphere, leaving a fresh coat of niobium and other s-process elements on the white dwarf's face.

To support this idea, the team looked at observations of HS 0209+0832 taken with the TESS space telescope, which hunts exoplanets by observing small changes in the light of their stars as planets orbit. The white dwarf's brightness changes with a period of about 4.4 days, the team found. That's too slow to be related to the white dwarf's own rotation.

But it could be explained by a gas giant planet orbiting very close to the star, about 4 percent the distance from the Earth to the sun or 6 million kilometers. Williams imagines it as a silvery version of Jupiter.

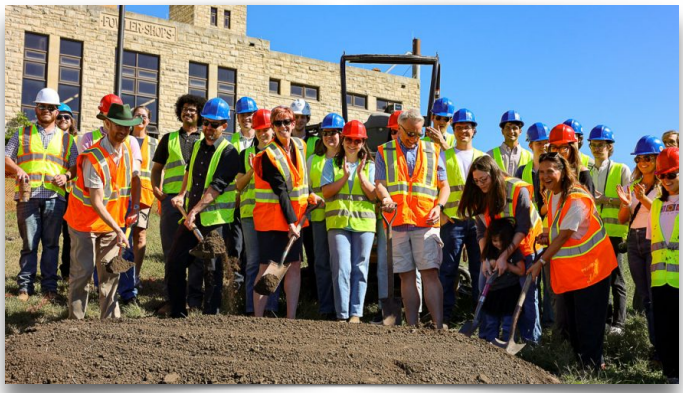
"We're not really sure, if it's not a planet, what it is," he says. "A planet is the most reasonable explanation."

Our sun will one day meet the same fate as HS 0209+0832's predecessor. We don't know enough about second-generation planets yet to say whether our solar system could end up with one after the sun dies, Williams says. "But I think it's definitely possible." ☀

KU breaks ground on observatory for historic telescope

By Cuyler Dunn

The Lawrence Times, October 9, 2026



KU staff and students break ground for Tombaugh Observatory, which will hold a 140-year-old Clark Refractor telescope.

Students and staff from KU gathered Friday to break ground on a new observatory on campus that will be the future home of a 140-year-old telescope.

The Tombaugh Observatory is named after Clyde Tombaugh, a Kansas native who discovered Pluto in 1930. He later graduated from KU.

The project is a joint venture between the architecture and design school and the physics and astronomy department.

“In the Midwest, we’re so dedicated to the land, yet also connected to the cosmos and the stars above us,” said Chad Kraus, an architecture professor at KU. “I just love that story, and I love how this little observatory is going to make that connection possible.”



A rendering of Tombaugh Observatory

The observatory will be home to a 6-inch Clark Refractor telescope KU acquired in 1885. It has survived multiple observatories and relocations during its time in Lawrence.

For about 50 years, the telescope was housed in an observatory on the roof of Lindley Hall. But in recent years, the telescope has been in storage in the Malott Hall basement due to the deteriorating conditions of the Lindley Hall rooftop observatory.

The new Tombaugh Observatory aims to restore public and academic access to the telescope.

“This is really an intrinsic part of KU’s history, and we’re really thrilled to give it a new home,” said Ian Crossfield, a physics and astronomy professor.

The observatory will be on the lawn between Chalmers and Slawson Hall.

Jen Roberts, the executive dean of the College of Liberal Arts and Sciences said the observatory would allow “experiential learning for our students, but also for our community members.”

“This has been a wonderful collaboration,” she said.

☀

'Swamp-like colors' on the moon: New NASA report reveals strange sights from Artemis II mission — Space photo of the week

Astronauts on NASA's Artemis II mission saw surprising "jaundiced yellow" and "swampy green" colors on the moon during their close lunar flyby, a new report reveals.

By Brandon Specktor

LIVESCIENCE, OCTOBER 11, 2026



A photo of Aristarchus Plateau (top right) taken by the Artemis II crew in April shows surprising brown and green features.

What color is the moon? Ask an Earthling, and you'll get a predictably monochromatic answer: white or gray.

But ask the four crewmembers of NASA's Artemis II mission — who spent nearly seven hours circling the moon from just 4,000 miles (6,400 kilometers) from the lunar surface this April — and you'll wonder if they're talking about the same dusty satellite we can see from Earth.

Yellow, brown, green, blue and tan features fan across vast volcanic plains and lurk at the edges of ominous craters, according to the crew's in-the-moment observations, which were shared this week in NASA's Artemis II Preliminary Lunar Science Report. The 130-page document catalogs everything crewmembers Reid Wiseman, Victor Glover, Christina Koch and

Jeremy Hansen saw during their historic close flyby of the moon on April 6, drawing from 814 gigabytes of photo, video and audio recordings taken from the Orion crew capsule.

This rainbow of lunar color represents distinct geological features that could inform future missions on where to land and where to explore as the world's space agencies race to set up a permanent presence on the moon.

One spot that particularly enthralled the astronauts (and is featured in the image above) is the Aristarchus Plateau — a broad, elevated region on the northwestern edge of the moon's nearside. The region hosts one of the moon's densest collections of ancient volcanic features, including swaths of dark lava deposits and colorful volcanic glasses.

Koch, mission specialist for Artemis II, was shocked to see distinct yellow shades in the region; she likened the plateau to "a yellow snow-capped mountain," with sunlight-reflecting craters providing the bright "snow." She went on to call the region "a jaundiced cheek of the Moon."

"There are so many colors now," Glover, Artemis II's pilot, added while photographing the area. "There's also a green. I see brown, especially Aristarchus and north toward the north pole. … It kind of flows down from the north in brown streaks."

According to the report authors, these colorful hues "could be associated with orange (titanium-rich) and green (magnesium-rich) glass beads respectively," similar to volcanic glass beads collected by the Apollo 15 and 17 missions on separate parts of the moon.

"Chaos across the entire area"

Another colorful patch of the lunar surface that caught the crew's attention was Orientale Basin — a huge, young and multiringed impact crater that's about three times as wide as Massachusetts, according to NASA. Straddling the moon's near and far sides, this massive bull's-eye is rarely visible from Earth, but it dominated the crewmembers' field of view as they orbited around the side of the moon.

"It has just created chaos across that entire area," Wiseman, commander for the mission, said at the time.

When flying over this sprawling basin, the crew noted gray, brown, tan and green below. The largest, outermost ring in the basin contained "almost swamp-like colors," Koch reported, while Glover spotted what looked like "dusted peaks" and "white on the very edges of [the mountains], the spines, the ridgebacks." Chains of craters parading away from the impact site looked "like bubbles rising from a team of scuba divers below," Koch added.

While these may sound like off-the-cuff observations, the Artemis II crew spent more than two years training to study and describe the moon's geology. Their regimen included visiting craters on Earth, taking lessons individually and in classrooms, conducting simulated flybys and, according to the report, bringing "self-selected reference materials" into the Orion capsule to read on the way to the moon.

Thanks to this training, the crew's observations provided a wealth of scientific information that no autonomous camera or orbiter could, the report said.

"The Artemis II mission demonstrated the exceptional value of human observation and cognition as scientific assets in planetary exploration," the report authors concluded. "Unlike cameras, which capture isolated moments and often narrow subsets of a scene, human observers continuously interpret their surroundings, integrating realtime visual perception with contextual understanding."

Or, to put that in Glover's more relatable words to mission control, "It's quite a wicked view." ☀

The Backyard Observer, November 2026

By Rick Heshmeyer

Taurus

Look high in the eastern night sky this month and you'll spot a familiar constellation, Taurus, the Bull.

On ancient star charts, Taurus was often depicted as swimming, with only the head (represented by the Hyades star cluster), the shoulders (pinned by the Pleiades star cluster) and the horns (marked by the stars Beta and Zeta Tauri) exposed above the water. Within this constellation there are several famous astronomical landmarks which we will explore this month.

Alpha Tauri, more commonly known as Aldebaran, has traditionally represented the Bull's eye because of its red/orange color. Although Aldebaran appears from Earth to be a member of the Hyades Star Cluster, it is only half as distant from the Earth as the cluster's other members. This star's beautiful color is easily observed with the naked eye.

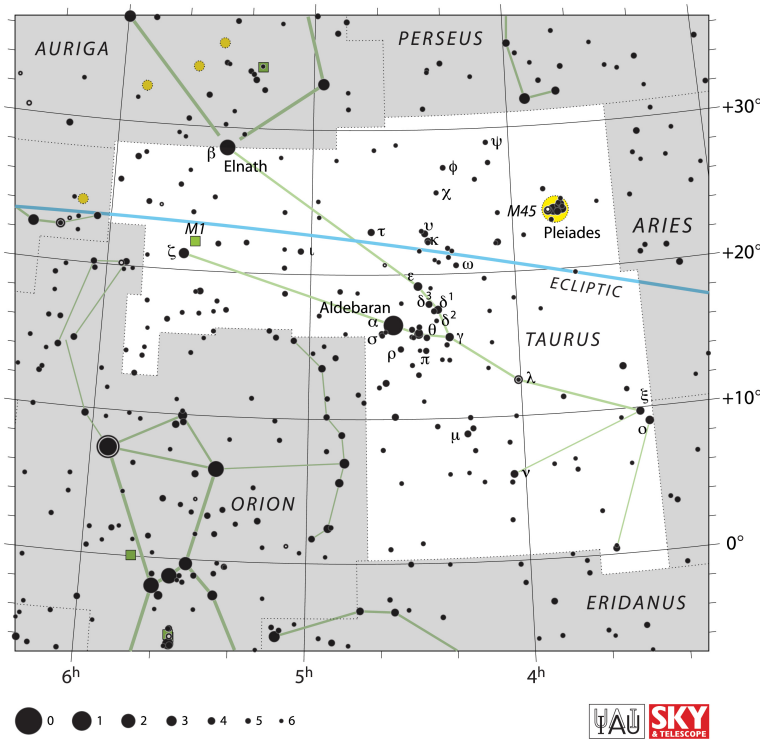
Messier 1, the first object listed in Charles Messier's catalog is the famous Crab Nebula. It is the remnant of a supernova explosion observed in China on July 4, 1054. As the star exploded it became so bright that it could easily be observed in daylight for months, and at night for more than a year. All that remains now is a rapidly expanding gas cloud (expanding at a rate of 600 miles per second!) surrounding a rotating neutron star, or pulsar. The Crab Nebula can be seen with a small telescope as a hazy spot without much detail. Only with larger scopes can much detail be discerned.

The Hyades Star Cluster is sometimes known as the "rainy stars" because the cluster's autumnal appearance coincided with seasonal rains. This easily recognizable V-shaped cluster is one of the closest open or galactic star clusters to the Earth, lying a mere 130 light years distant. Although the cluster is visible to the naked eye, it is most beautiful in binoculars and telescopes at low power.

Any clear night this month look Taurus and you'll see the most dazzling naked-eye star cluster in the heavens, Messier 45, also known as the Pleiades. In ancient mythology, the Pleiades were the seven daughters of Atlas and Pleione, thus the cluster's nickname the Seven Sisters. They were being pursued by the hunter Orion but were saved by Jupiter when he first changed them into pigeons and then into stars and placed them in the sky. How many stars can you see with the naked eye from your location? Most people would agree with six but reports of people seeing as many as fourteen are recorded. A small telescope will reveal nearly one hundred stars, but the best views of this cluster are not seen through a telescope, but with binoculars. With their wider field-of-view, observers with binoculars are able to observe the entire cluster in its brilliant splendor.

Often the Pleiades are mistaken for the Little Dipper asterism, because of the stubby dipper shape presented by the cluster's brightest members. The distance to the cluster has been estimated at 410 light years, making it one of the nearest galactic or open clusters in the sky. The age of the cluster is approximately 20 million years.

In addition to the beauty of the cluster as a whole, there are several special aspects of the Pleiades worth trying to observe. The entire Pleiades cluster is associated with a large area of nebulosity, the majority of which is visible in long-exposure photographs, but one small segment, extending southward from the star Merope (known independently as IC 349 or the Merope Nebula) can be glimpsed from a good location under good conditions with 6-8 inch telescopes. This wispy nebula has been described as a faint smear of fog, like the effect of breath on a mirror.



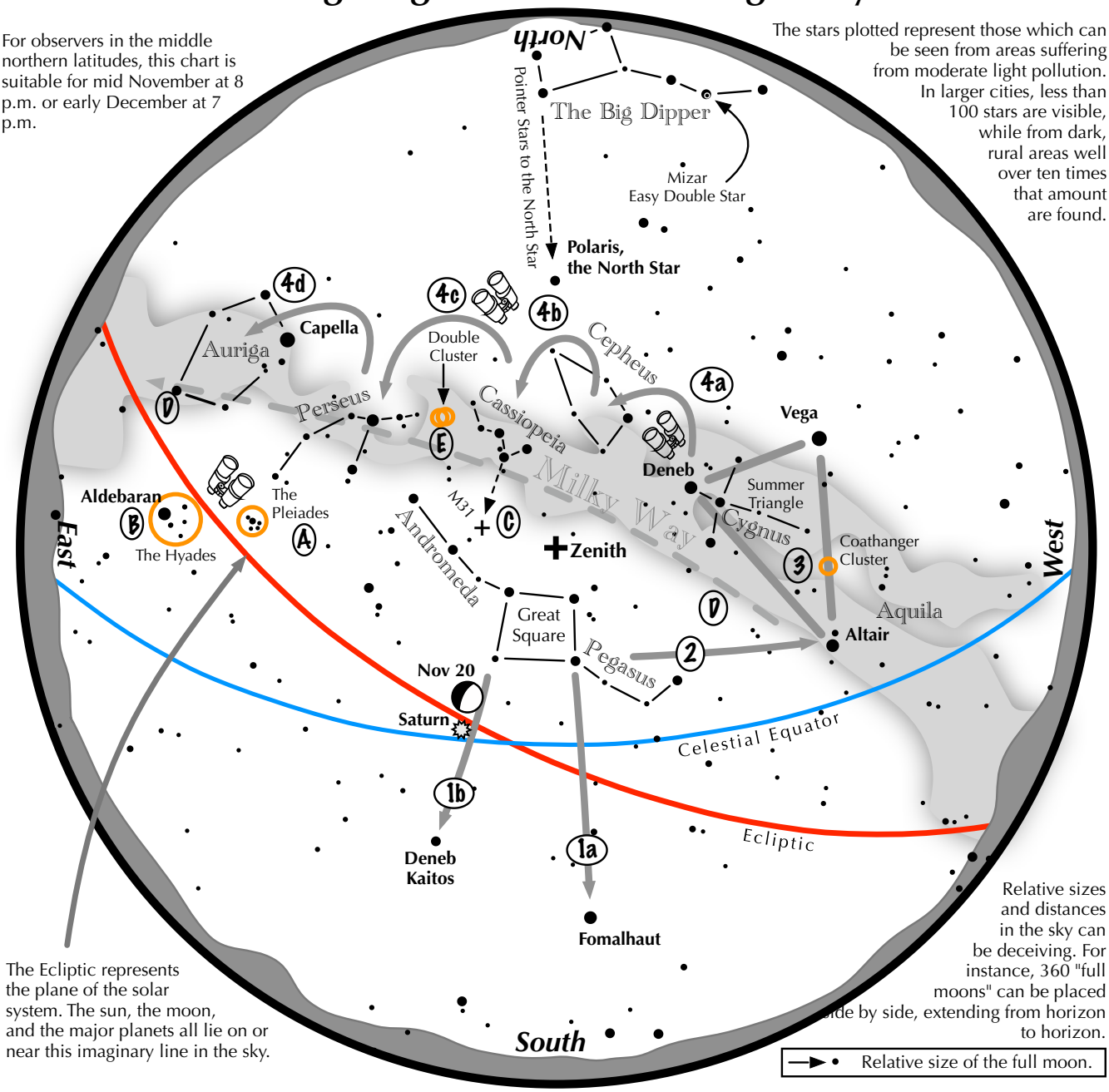
NGC 1647 is an open star cluster, dimmer than the Hyades or M-45, the other major clusters in Taurus. Located north of the Hyades cluster and between the two horns of the Bull, this cluster contains 20-25 bright members. In binoculars this group can be seen as a fuzzy glow. In telescopes, the individual members can be seen easily.

Navigating the November Night Sky

2026

For observers in the middle northern latitudes, this chart is suitable for mid November at 8 p.m. or early December at 7 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 November night sky: Simply start with what you know or with what you can easily find.

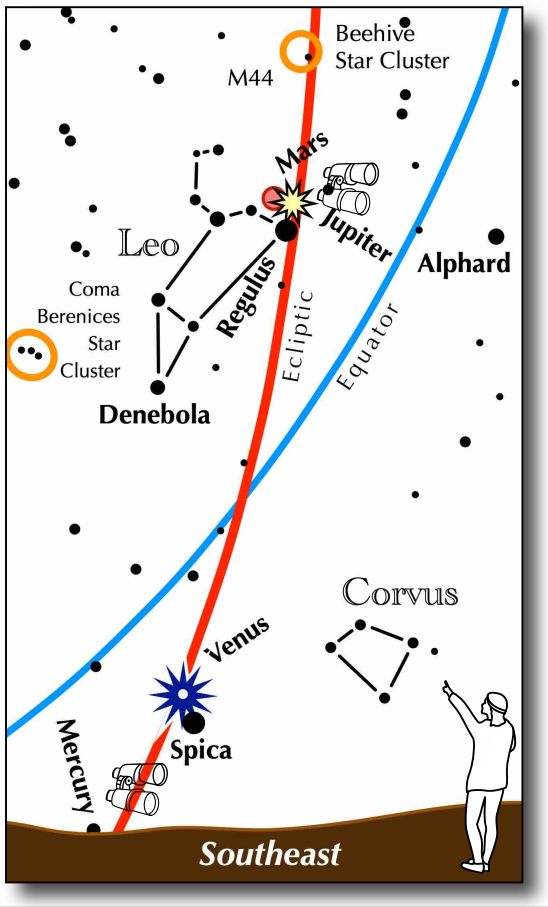
1. Face south. Almost overhead lies the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend a line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the south. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second brighest star in the south.
2. Draw a line westward following the southern edge of the Square until 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, then 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. **E.** The Double Cluster.

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

In the early mornings around November 15-18, try this activity:



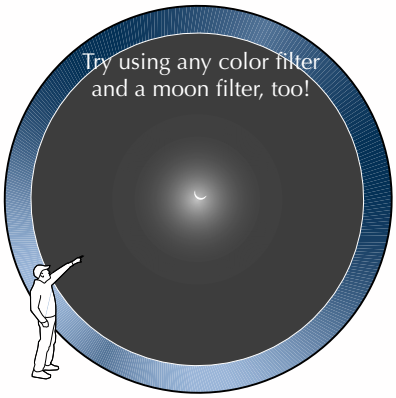
Count the bright celestial wonders strung along the ecliptic

1. Red Mars meets bright Jupiter high in the southeast ninety minutes before sunrise. Grouped with them is the brightest star in Leo, Regulus.

2. Much nearer the southeastern horizon shines brilliant Venus sitting just above the bright star Spica.

3. 40 minutes before sunrise, little Mercury pops above the horizon, far below Venus. Binoculars help spot it in the bright twilight.

Grab a quick look at **Venus** through any telescope. Its beautiful, thin, and brilliant crescent awaits! As the mornings pass, the crescent grows smaller, but thicker.



View in the southeast on November 15-18 90 minutes before sunrise

What a great way to start your day!

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.