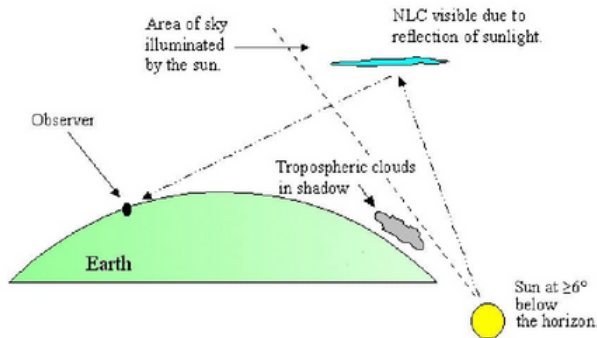


SKYWATCHER NEWSLETTER

LATEST NEWS

It is almost Summer Solstice and the light evenings are very enjoyable but certainly doesn't leave much opportunity for dark sky observing!

Enjoy the sunny days while we can and keep a watch out for Noctilucent clouds. There has been some amazing displays in recent years and this year we hope does not disappoint Until next month... SLK



Look Up in the Sky - It's a Bird

By: Theresa Summer

Bird constellations abound in the night sky, including Cygnus, the majestic swan. Easy to find with its dazzling stars, it is one of the few constellations that look like its namesake and it is full of treasures. Visible in the Northern Hemisphere all summer long, there's so much to see and even some things that can't be seen. To locate Cygnus, start with the brightest star, Deneb, also the northeastern most and dimmest star of the Summer Triangle. The Summer Triangle is made up of three bright stars from three different constellations – read more about it in the September 2022 issue of Night Sky Notes. "Deneb" is an Arabic word meaning the tail. Then travel into the triangle until you see the star Albireo, sometimes called the "beak star" in the center of the summer triangle. Stretching out perpendicular from this line are two stars that mark the crossbar, or the wings, and there are also faint stars that extend the swan's wings.

From light-polluted skies, you may only see the brightest stars, sometimes called the Northern Cross. In a darker sky, the line of stars marking the neck of the swan travels along the band of the Milky Way. A pair of binoculars will resolve many stars along that path, including a sparkling open cluster of stars designated Messier 29, found just south of the swan's torso star. This grouping of young stars may appear to have a reddish hue due to nearby excited gas.



Look up after sunset during summer months to find Cygnus! Along the swan's neck find the band of our Milky Way Galaxy. Use a telescope to resolve the colorful stars of Albireo or search out the open cluster of stars in Messier 29. Image created with assistance from Stellarium: stellarium.org

Let's go deeper. While the bright beak star Albireo is easy to pick out, a telescope will let its true beauty shine! Like a jewel box in the sky, magnification shows a beautiful visual double star, with a vivid gold star and a brilliant blue star in the same field of view. There's another marvel to be seen with a telescope or strong binoculars – the Cygnus Loop. Sometimes known as the Veil Nebula, you can find this supernova remnant (the gassy leftovers blown off of a large dying star) directly above the final two stars of the swan's eastern wing. It will look like a faint ring of illuminated gas about three degrees across (six times the diameter of the Moon).

Speaking of long-dead stars, astronomers have detected a high-energy X-ray source in Cygnus that we can't see with our eyes or backyard telescopes, but that is detectable by NASA's Chandra X-ray Observatory. Discovered in 1971 during a rocket flight, Cygnus x-1 is the first X-ray source to be widely accepted as a black hole. This black hole is the final stage of a giant star's life, with a mass of about 20 Suns. Cygnus x-1 is spinning at a phenomenal rate – more than 800 times a second – while devouring a nearby star. Astronomically speaking, this black hole is in our neighborhood, 6,070 light years away.

But it poses no threat to us, just offers a new way to study the universe.

Check out the beautiful bird in your sky this evening, and you will be delighted to add Cygnus to your go-to summer viewing list. Find out NASA's latest methods for studying black holes at www.nasa.gov/black-holes.

LOCAL EVENTS

May 17 - CADAS - Ask the Panel

June 6 - WAS - David Smith – (Buglife) Bugs, the First Astronomers

June 21 - CADAS - Jo Richardson Dark sies of Exmoor

July 4 - WAS - Nial Tanvir – Re-ionisation of the Universe/GRBs (exact title to follow)

Aug 1 - WAS - Quiz evening

Sept 5 - WAS - David Bryant – Meteorites (exact title to follow)

VISIT OUR WEBSITE FOR THE LATEST CLUB INFORMATION

SKYWATCHER NEWSLETTER

Spaceweather.com

MYSTERIOUS "AURORA BLOBS" EXPLAINED

18 May 2023



Europeans are still trying to wrap their minds around what happened after sunset on April 23, 2023. Everyone knew that a CME was coming; photographers were already outside waiting for auroras. But when the auroras appeared, they were very strange.

"I had never seen anything quite like it," says Heiko Ulbricht of Saxony, Germany. "The auroras began to tear themselves apart, pulsating as they formed individual blobs that floated high in the sky."

"It literally took my breath away," he says. "My pulse was still racing hours later!" The same blobs were sighted in France and Poland, and in Denmark they were caught flashing like a disco strobe light.

Ordinary auroras don't act like this.

Indeed, "these were not ordinary auroras," confirms space physicist Toshi Nishimura of Boston University. "They are called 'proton auroras,' and they come from Earth's ring current system."

Most people don't realize that Earth has rings. Unlike Saturn's rings, which are vast disks of glittering ice, Earth's rings are invisible to the naked eye. They are made of electricity--a donut-shaped circuit carrying millions of amps around our planet. The ring current skims the orbits of geosynchronous satellites and plays a huge role in determining the severity of geomagnetic storms.

Sometimes during strong geomagnetic storms, protons rain down from the ring system, causing a secondary shower of electrons, which strike the atmosphere and make auroras. Earth-orbiting satellites have actually seen these protons on their way down. Ordinary auroras, on the other hand, are caused by particles from more distant parts of Earth's magnetosphere and have nothing to do with Earth's ring current.

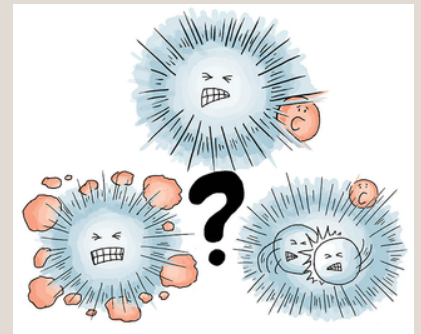
Mystery solved? Not entirely. "We still don't know why proton auroras seem to tear themselves apart in such a dramatic way," says Nishimura. "This is a question for future research."

"It was very exciting to watch," says Ulbricht. "I definitely want to see them again."

Good, because they'll be back. Solar Cycle 25 ramping up to a potentially-strong Solar Maximum next year. Future storms will surely knock more protons loose from the ring current system.

Here's what to look for: (1) Proton auroras tend to appear around sunset. Why? Electric fields in Earth's magnetosphere push the protons toward the dusk not dawn side of our planet. (2) Proton auroras love to pulse--a sign of plasma wave activity in Earth's ring current. (3) Proton auroras are sometimes accompanied by deep red arcs of light (SARs), the glow of heat leaking from the ring current system. These red arcs were also seen on April 23rd.

Solar Max is coming. Let the proton rain begin!



WAC Upcoming Events

JULY 14 - JULIAN ONIONS: COLD DARK MATTER - IS IT COLD, IS IT DARK AND IS IT MATTER? (FACE TO FACE AND ZOOM)

AUG 11 - MEMBERS VIEWING EVENING FOR THE PERSEID METEORS AND SUMMER CONSTELLATIONS.

SEPT 8 - ROCKETS ON THE BEACH

OCT 13 - RICHARD MILES: THE HISTORY OF AN EXPLOSIVE COMET (FACE TO FACE AND ZOOM)

MORE TO COME!!

Earth's Magnetosphere

The inner magnetosphere is composed of three populations of charged particles that are trapped in the Earth's magnetic field. These particles move in circular motions—or gyrate—around the field lines but rarely interact with each other.

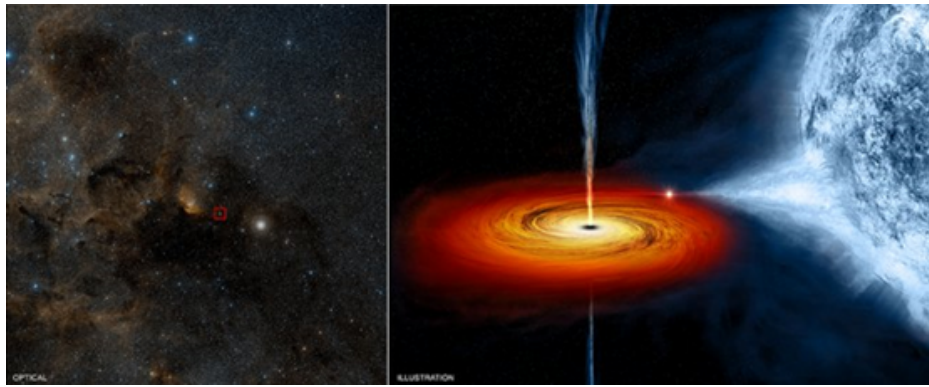
Ring Current
The ring current is a population of medium-energy particles that drift around the Earth, with protons drifting in one direction and electrons drifting in the opposite direction.

Plasmasphere
The plasmasphere is composed of low-energy particles that drift around the Earth, forming a sphere-like reservoir of very cold, fairly dense plasma that co-rotates with the Earth.

Van Allen Radiation Belts
The Van Allen Belts consist of high-energy particles that are trapped in two regions. These particles move along the field lines toward the poles until they are reflected back, creating a bouncing movement. Particles with a high enough velocity along the magnetic field will follow the field lines to the poles and enter the upper atmosphere.

Ring Current Data
A Coronal Mass Ejection (CME) occurs when magnetic forces overcome pressure and gravity in the solar corona. This lifts a huge mass of solar plasma from the corona and creates a shock wave that accelerates some of the solar wind's particles to extremely high energies and speeds. This in turn generates radiation in the form of energetic particles.

RBSP
NASA's Radiation Belt Storm Probes (RBSP) mission will help scientists better understand the processes in the radiation belts. The technological challenge for RBSP is to withstand the very energetic trapped electrons and ions in the radiation belts that are extremely harmful to spacecraft. The Space Radiation Pioneers (SRP) will provide the protective cover of the Earth's magnetosphere. Most important, however, RBSP is designed to fly past through these belts relatively quickly.



Continued from page 1:

While the black hole Cygnus x-1 is invisible with even the most powerful Optical telescope, in X-ray, it shines brightly. On the left is the optical view of that region with the location of Cygnus x-1 shown in the red box as taken by the Digitized Sky Survey. On the right is an artist's conception of the black hole pulling material from its massive blue companion star.

(Credit: NASA/CXC
chandra.harvard.edu/photo/2011/cygx1/)



PRACTICAL OBSERVING

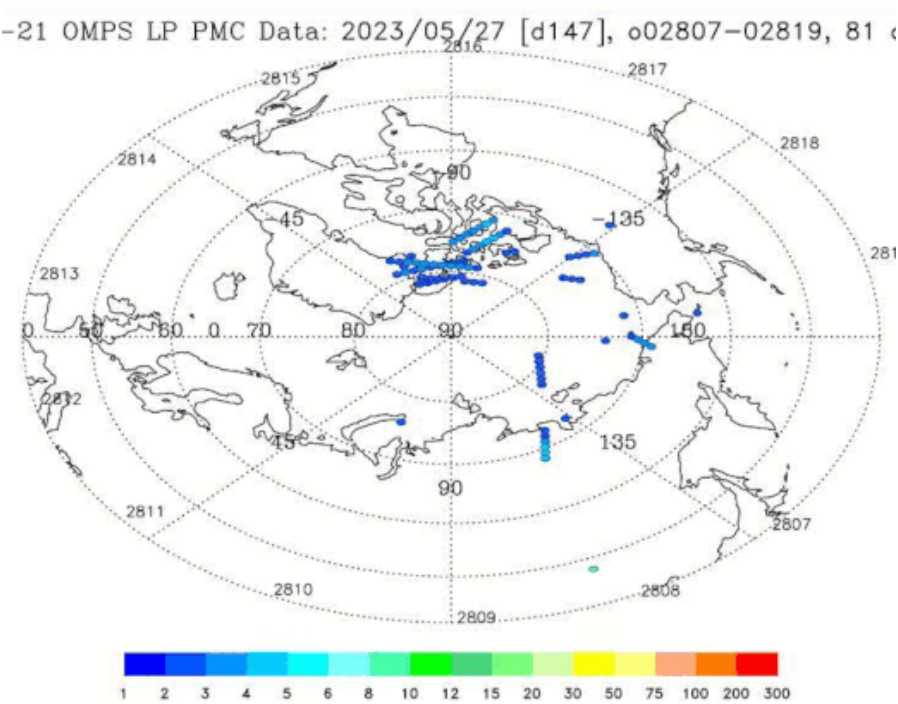
Spaceweather.com 6 June 2023

THEY'RE BACK! NOCTILUCENT CLOUDS: The summer season for noctilucent clouds (NLCs) has begun. "They're back with a bang!" says Arnim Berhorst who saw the electric-blue clouds over Bergen, Norway--one of at least seven European countries where they were observed on June 5th. Valther Jørgensen sends this picture from Djursland, Denmark:

"These luminous night clouds appeared for the first time over Denmark this summer," says Jørgensen.

NLCs are clouds of frosted meteor smoke. They form every year in summer when wisps of sunwarmed water vapor rise up to the edge of space. At altitudes greater than 80 km, the water crystallizes around disintegrated meteoroids, forming beautiful electric-blue structures.

Although these are the first NLCs seen from the ground, Earth-orbiting satellites have been monitoring them for more than a week. The NOAA-21 satellite saw them first on May 26th. In this 3 day animation, blue dots mark the location of clouds deep inside the Arctic Circle:



Noctilucent Clouds
 Bad news: NASA's AIM spacecraft, which monitors noctilucent clouds, [may be dead](#) due to problems with an onboard battery. Mission controllers have not yet given up all hope, so stay tuned.

Image credit: Matt DeLand // NOAA-21 OMPS LP instrument

This is typical. NLCs always form first over the poles where temperatures are coldest--a necessity for making water molecules stick to meteoroids. From there, the clouds multiply and spread outward. In only 3 days (May 26, May 27, May 28), NOAA-21 saw cloud counts increase from 14 to 104 as they drifted south toward Europe.

Last night's sightings are just the beginning. Noctilucent cloud season typically runs from June to August. The clouds tend to brighten and become most widespread around the summer solstice, with sightings in recent years as far south as Spain and southern California. If you see an NLC, submit your photo here.

Skymaps.com—Feel free to download the full article directly each month.

The Evening Sky Map

FREE! EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

Sky Calendar – June 2023

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NORTHERN HEMISPHERE

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY JUN 11 PM
LATE JUN 10 PM
(Mid 1 hour for daylight-saving)
SKY MAP DOWN FOR A LATITUDE OF 40°
NORTH AND IS SUITABLE FOR LONGITUDES UP TO 35° NORTH OR SOUTH OF THIS

The Big Dipper is an easy-to-recognize asterism in the constellation Ursa Major (The Great Bear).
The wheel-shaped asterism in the constellation Bootes (The Heron) depicts a man heading a man heading a bull (ursa Major).
The compass direction that appears along the bottom of the map is the same as the direction that you face. Begin by using the sky map to find a bright star pattern in the sky. Almost directly overhead lies the small but distinctive constellation Corona Borealis (The Wreath).
Job's Coffin is the name given to the box-shaped asterism in the constellation Delphinus (The Dolphin).

Symbols

Galaxy ●
Double Star ○
Variable Star ◆
Diffuse Nebula ◊
Planetary Nebula ◇
Open Star Cluster ○
Globular Star Cluster ⊕

Star Magnitudes

-1 0 1 2 3 4

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2 Mars 0.16° NNE of Beehive cluster (M44) at 23h UT (56° from Sun, evening sky). Mag. -1.6.

3 Moon near Antares at 23h UT (evening sky).

4 Venus at dichotomy (D-shape) at 3h UT (evening sky).

4 Full Moon at 3:43 UT.

4 Venus at greatest elongation east at 11h UT (45° from Sun, evening sky). Mag. -4.3.

6 Moon at perigee (closest to Earth) at 23:14 UT (distance 364,861km; angular size 32.7').

9 Moon near Saturn at 23h UT (morning sky). Mag. 0.9.

10 Last Quarter Moon at 19:31 UT.

14 Venus 0.8° NNE of Beehive cluster (M44) at 1h UT (45° from Sun, evening sky). Mag. -4.4.

14 Moon near Jupiter at 6h UT (morning sky). Mag. -2.1.

16 Moon near Pleiades at 3h UT (25° from Sun, morning sky).

17 Mercury 4.3° NNW of Aldebaran at 1h UT (16° from Sun, morning sky). Mag. -0.8.

18 New Moon at 4:38 UT. Start of lunation 1243.

21 Moon near Beehive cluster M44 at 14h UT (38° from Sun, evening sky).

21 June solstice at 15:01 UT. The time when the Sun reaches the point farthest north of the celestial equator marking the start of summer in the Northern Hemisphere and winter in the Southern Hemisphere.

22 Moon near Venus at 4h UT (44° from Sun, evening sky). Mag. -4.4. Beautiful pairing with Mars nearby!

22 Moon, Venus and Mars within circle of diameter 5° at 8h UT (46° from Sun, evening sky). Mags. -4.4 and 1.7.

22 Moon near Mars at 14h UT (evening sky). Mag. 1.7.

22 Moon at apogee (farthest from Earth) at 19h UT (distance 405,385km; angular size 29.5').

23 Moon near Regulus at 12h UT (evening sky).

26 First Quarter Moon at 7:50 UT.

27 Moon near Spica at 23h UT (evening sky).

More sky events and links at <http://Skymaps.com/skycalendar/>
All times in Universal Time (UT). (USA Eastern Daylight Time = UT - 4 hours.)

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