



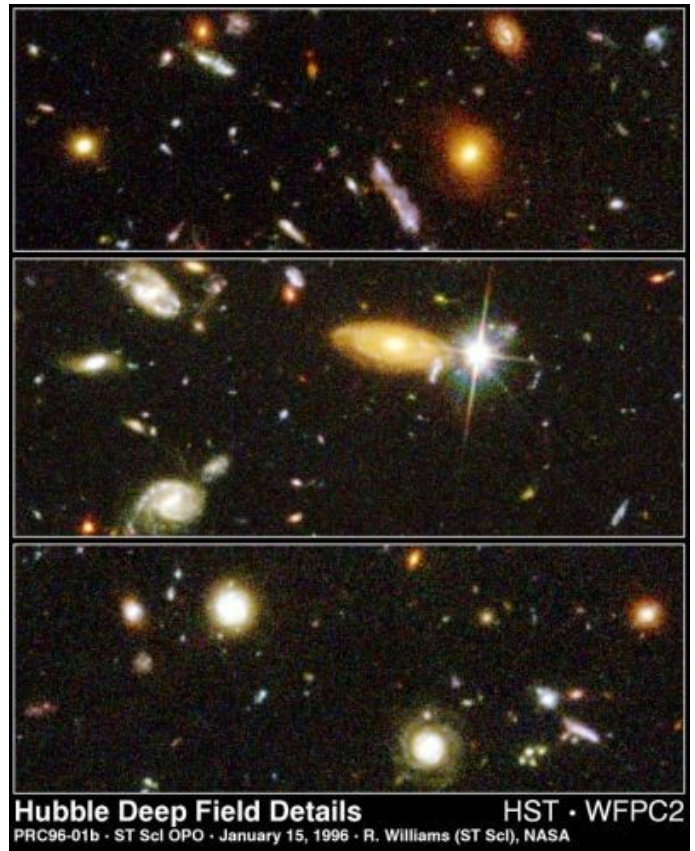
Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Apr 2020

Events:

No General Meeting in April.

Until we can resume our monthly meetings, you can still interact with your astronomy associates on Facebook or by posting a message to our mailing list.



General information:

Subscription to the TVA is included in the annual \$25 membership (regular members) donation (\$9 student; \$35 family).

President: Mark Baker 951-691-0101

[<shknbk13@hotmail.com>](mailto:shknbk13@hotmail.com)

Vice President: Sam Pitts [<sam@samsastro.com>](mailto:sam@samsastro.com)

Past President: John Garrett [<garrjohn@gmail.com>](mailto:garrjohn@gmail.com)

Treasurer: Curtis Croulet [<calypte@verizon.net>](mailto:calypte@verizon.net)

Secretary: Deborah Baker [<geedeb@gmail.com>](mailto:geedeb@gmail.com)

Club Librarian: Vacant

[Facebook](#): Tim Deardorff [<tim-deardorff@yahoo.com>](mailto:tim-deardorff@yahoo.com)

Star Party Coordinator and Outreach: Deborah Baker

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WHAT'S INSIDE THIS MONTH:

Cosmic Comments

by President Mark Baker

Looking Up Redux

compiled by Clark Williams

Darkness – Part III

by Mark DiVecchio

Hubble at 30: Three Decades

of Cosmic Discovery

by David Prosper

Send newsletter submissions to Mark DiVecchio [<markd@silogic.com>](mailto:markd@silogic.com) by the 20th of the month for the next month's issue.

Like us on [Facebook](#)



Cosmic Comments by President Mark Baker

One of the things commonly overlooked about Space related Missions is time, and of course, timing...!!! Many programs take a decade just to get them in place and off the ground, and many can take twice that long...just look at the James Webb Telescope!!! So there's the "time" aspect of such endeavors...what about timing??

I mentioned last month that July is looking like a busy month for Martian Missions... here's a refresher:

- 1) The NASA **Mars 2020 rover Perseverance** and its helicopter drone companion (aka Lone Ranger and Tonto, as I called them) is still on schedule. Timing – GO!!!
- 2) The UAE **Hope Mars Mission** is still launching from Japan. Timing – GO!!!
- 3) China's HX-1 lander / rover are on schedule as well. Timing – GO!!
- 4) But the joint ESA / Russian **ExoMars Rosalind Franklin Rover** has an issue with its parachute deployments and is now having to be rescheduled to 2022. Timing – NO GO!!!

And here's where timing comes in...due to the continued use of Neanderthal propulsion systems – we are still burning stuff!! – planetary alignments can mean a lot. The orbit of Mars is especially unforgiving and as ExoMars cannot make the launch window for 2020, it now has to wait TWO FULL YEARS for the next... timing is everything when windows are small and we cannot propel our craft with anything above Stone Age technology – yet!!!

I personally was really looking forward to Curiosity being joined by all the other rovers, but will have to settle for one less – for now!!! Hopefully, the others stay on track or guess what?? They'll be waiting for 2022 also...!!!

Hopefully, once current circumstance stabilizes, we of TVA won't be waiting for long - and especially not 2022!!! – to resume our meetings, events, and Outreach... that would be timing of an intolerable nature for me!! So you all stay safe, be healthy, and remember... "The Stars Are Calling, So We Must Go"!!!

Clear, Dark Skies my Friends...





Looking Up Redux compiled by Clark Williams

from these sources:

SeaSky.org

Wikipedia.com

in-the-sky.org

The American Meteor Society, Ltd.

cometwatch.co.uk

NASA.gov

TVA App (2.0.1296)

FullAndNewMoon App (2.0)

Starry Night Pro Plus 7 (7.6.3.1373)

SkySafari 6 Pro (6.1.1)

Stellarium (0.18.2)

timeanddate.com/astronomy



ALL TIMES ARE LOCAL PACIFIC TIME (PDT / PST) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)

hh:mm:ss or hhmmss

hhmm+ (time of the next day)

hhmm- (time of the previous day)

hhmm (seconds not shown)

yyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Wednesday	the 1 st	@ 0322	FIRST QTR in GEMINI
Tuesday	the 7 th	@ 1936	FULL in VIRGO
Tuesday	the 14 th	@ 1557	THIRD QTR in SAGITTARIUS
Wednesday	the 22 nd	@ 1926	NEW in PISCES
Thursday	the 30 th	@ 1339	First QTR in CANCER

Apogee comes on 2020-04-20 @ 1902 - 406,461 km (252,564 mi)

Perigee comes on 2020-04-07 @ 1810 - 356,908 km (221,901 mi)

2020 has: (12) new moons, (13) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2020-Mar-08 : Ends: 2020-Nov-01

Luna: Luna is in First Quarter on the 1st of the month transiting at 1937 setting by 0301+. Luna by mid-month is 42% illuminated. Rising early at 0230 and setting in early afternoon at 1249. By the-end-of-the-month Luna is once again in First Quarter, 50% illuminated transiting at 1921 and setting by 0231+.



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Highlights: (distilled from: SeaSky.org and Clark's planetary Orrey program[s])

April 8 - Full Moon, Supermoon*. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at 02:35 UTC.

This full moon was known by early Native American tribes as the Full Pink Moon because it marked the appearance of the moss pink, or wild ground phlox, which is one of the first spring flowers. This moon has also been known as the Sprouting Grass Moon, the Growing Moon, and the Egg Moon. Many coastal tribes called it the Full Fish Moon because this was the time that the shad swam upstream to spawn.

This is also the third of four supermoons* for 2020. The Moon will be at its closest approach to the Earth and may look slightly larger and brighter than usual.

April 22, 23 - Lyrids Meteor Shower. The Lyrids is an average shower, usually producing about 20 meteors per hour at its peak. It is produced by dust particles left behind by comet C/1861 G1 Thatcher, which was discovered in 1861. The shower runs annually from April 16-25. It peaks this year on the night of the night of the 22nd and morning of the 23rd. These meteors can sometimes produce bright dust trails that last for several seconds. The nearly new moon will ensure dark skies for what should be a good show this year. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Lyra, but can appear anywhere in the sky.

April 23 - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 02:27 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

* Supermoon is an Astrology term not an Astronomy term.



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Algol minima: (All times Pacific Time)

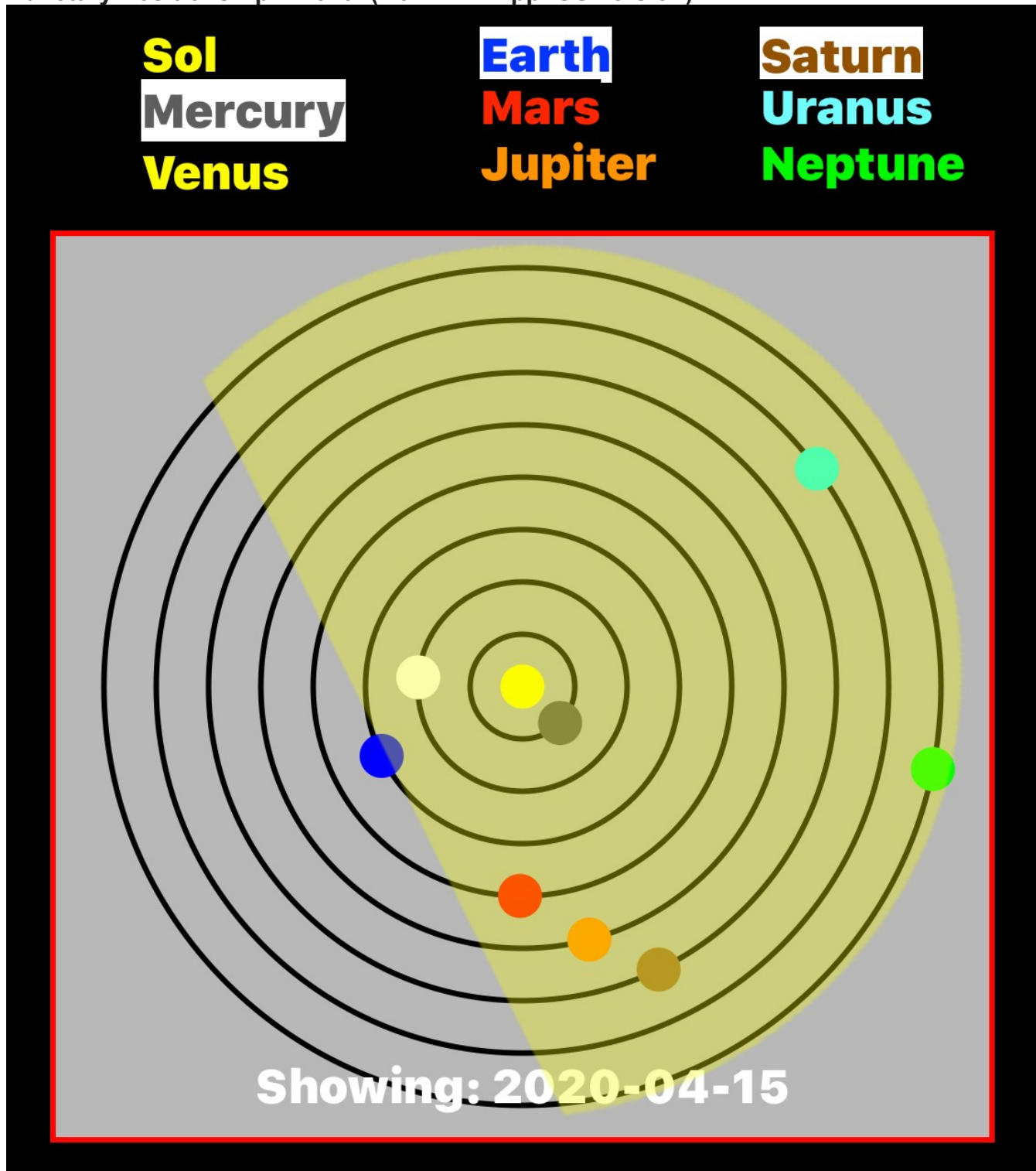
04/03/2020	0547
04/06/2020	0236
04/08/2020	2325
04/11/2020	2014
04/14/2020	1703
04/17/2020	1352
04/20/2020	1041
04/23/2020	0731
04/26/2020	0420
04/29/2020	0109

Sun and Moon Rise and Set Times

		Rise	Transit	Set
04/01/20	Sun	061511	120125	174744
	Moon	101217	174442	002148+
04/15/20	Sun	065709	125754	185851
	Moon	015705	070404	121107
04/31/20	Sun	063538	125308	191053
	Moon	111745	184211	020731+

Planets:

Planetary Positions April 2020: (from TVA App iOS version)



- **Mercury:** Mercury is a morning object in the beginning of the month. It is illuminated at 64% and 0.07 apparent magnitude. Mercury rises at **0535** with the sun following at **0634**. Mercury



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by mid-month is rising at **0536** with Sol rising at **0616**. By the 30th Mercury is very close to the Sun, rising at **0549** preceding sunrise at **0559**.

- **Venus:** Is the Evening Star. Venus sets about **2259** following sunset at **1911** on the first. By mid-month Venus is setting at **2304**. By the 30th Venus is setting at **2249**.
- **Mars:** Mars is an early morning object and less than 1° from Saturn on the 1st of the month. Leading the Sun, Mars rises at **0316** on the first. By mid-month Mars is rising at **0255** but there is a third quarter Moon sitting just 9.5° to the west of Mars at 46% illumination. End-of-month finds the Warrior rising at **0229**. So if you're a night-owl or an extremely early riser the Red Planet is coming back into view.
- **Jupiter:** Jupiter is a morning object on the first of the month rising at **0249** and preceding sunrise at **0634**. Ol' Jove is also only about 1.5° from Pluto which rises at **0253**. By mid-month Jove is rising at **0159** the sun follows at **0616** but a last quarter Moon will wash out everything at 45% illumination and only 6° away. Come the end of month Jupiter is peaking above the horizon by **0104** with sunrise at **0559**. See Saturn below for the nice planetary grouping.
- **Saturn:** Saturn is trailing Jupiter and leading the Sun, Saturn rises about **0311** on the 1st while sunrise is at **0634**. Saturn is only 1° higher along the ecliptic than Mars on the first. So you should have a great photo grouping of Mar and Saturn. Mars will rise at **0316**. Saturn by mid month is rising by **0218** preceding sunrise at **0616**. There will be a 44% illuminated third quarter Moon washing everything out though. By the end-of-the-month Saturn is rising at **0121** followed by the sun at **0559**.
- **Uranus:** On the first Uranus doesn't set until **2056**. The apparent magnitude is 5.87 so we're on the ragged edge of being naked-eye visible. Luna is high in the sky and Waxing gibbous at 58% illumination but it is more than 77° east along the ecliptic. By the ides Uranus is setting at **2005**, following sunset by about half-an-hour. End-of-month finds Uranus obscured by the Sun.
- **Neptune:** Neptune is leading the Sun by about 55 minutes, rising at **0539** in the beginning of the month. You should be able to squeeze in a peek if you're up by that hour. By the 15th Neptune is rising at 0445, an hour-and-a-half before sunrise at **0616**. By the end of the month Neptune is rising at **0347** and Sol is rising at **0559**.
- **Pluto:** Pluto rises by **0253** on the first of the month preceding sunrise at **0634**. You'll have a great photo opportunity as Jupiter and Pluto are separated by less than 1°. By mid-month Pluto is rising by **0158** preceding moonrise at **0230**. By the 30th Pluto is rising at **0100**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2020 with a reasonable magnitude; say less than or equal to +10 in April there is nothing except the regulars: Juno, Vesta. Hebe, Eros and Herculina. So consult your local planetarium software or try:
<https://www.asteroidsnear.com/year?year=2020>

Meteors:

- **Lyrids** – April 16th to April 30th (From: American Meteor Society)
The Lyrids are a medium strength shower that usually produces good rates for three nights centered on the maximum. These meteors also usually lack persistent trains but can produce fireballs. These meteors are best seen from the northern hemisphere where the radiant is high in the sky at dawn. Activity from this shower can be seen from the southern hemisphere, but at a lower rate.



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Shower details - Radiant: 18:04 +34° - ZHR: 18 - Velocity: 30 miles/sec (medium - 48.4km/sec)
- Parent Object: C/1861 G1 (Thatcher)

Next Peak - The Lyrids will next peak on the Apr 21-22, 2020 night. On this night, the moon will be 1% full.

- **eta Aquariids** – April 19th to May 28th (From: [American Meteor Society](#))

The Eta Aquariids are a strong shower when viewed from the southern tropics. From the equator northward, they usually only produce medium rates of 10-30 per hour just before dawn. Activity is good for a week centered the night of maximum activity. These are swift meteors that produce a high percentage of persistent trains, but few fireballs.

Shower details - Radiant: 22:32 -1° - ZHR: 40 - Velocity: 42 miles/sec (swift - 66.9km/sec) - Parent Object: 1P/Halley

Next Peak - The eta Aquariids will next peak on the May 4-5, 2020 night. On this night, the moon will be 91% full.

- See Highlights above for more details. (SeaSky.org) (American Meteor Society)

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
 - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.
 - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
 - Short period comets April have a near circular orbit or an elliptical orbit. The latter being far more common.
- 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.

Nothing really available this month in comets, perhaps something in May.

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ

R/D abbreviation for Right Ascension/Declination

α is right ascension

δ is declination

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of April 2020 at 2100 PDT and you will have about 20 minutes of viewing time total.

Its galaxy season and The Virgo Diamond is high in the sky so lets look for some familiar objects:

- **Messier 49:**



By en:NASA, en:STScI, en:WikiSky - en:WikiSky's snapshot tool - [1], Public Domain, <https://commons.wikimedia.org/w/index.php?curid=7818531>

M 49, AKA: NGC 4472 is an elliptical galaxy located about 56 million light-years away in the equatorial constellation of Virgo. This galaxy was discovered by French astronomer Charles Messier on February 16, 1777. As an elliptical galaxy, Messier 49 has the

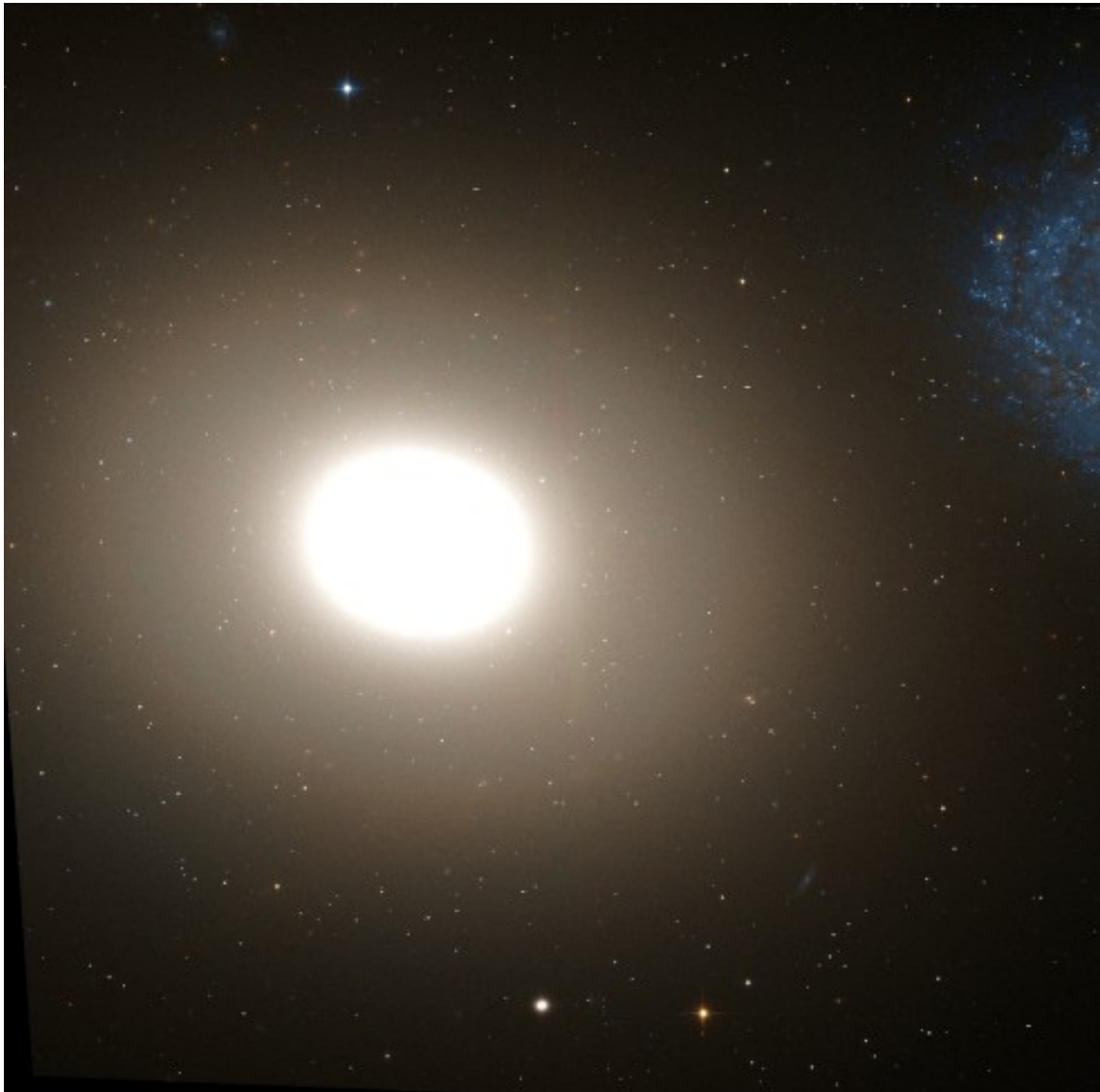


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physical form of a radio galaxy, but it only has the radio emission of a normal galaxy. From the detected radio emission, the core region has roughly 10^{53} erg (1046 J or 1022 YJ) of synchrotron energy. The nucleus of this galaxy is emitting X-rays, suggesting the likely presence of a supermassive black hole with an estimated mass of 5.65×10^8 solar masses, or 565 million times the mass of the Sun. X-ray emissions shows a structure to the north of Messier 49 that resembles a bow shock. To the southwest of the core, the luminous outline of the galaxy can be traced out to a distance of 260 kpc. The only supernova event observed within this galaxy is SN 1969Q, discovered in June 1969. (Wikipedia)

○ **Messier 60:**



*By en:NASA, en:STScI, en:WikiSky - en:WikiSky's snapshot tool - [1];
underlying source here., Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=17198140>*

M 60, AKA: NGC 4649, is an elliptical galaxy approximately 57 million light-years away in the equatorial constellation of Virgo. Together with NGC 4647, it forms a pair known as Arp 116. Messier 60 and the nearby spiral galaxy Messier 59 were both discovered by Johann Gottfried Koehler in April 1779 during observations of a comet in the same part of the sky. Charles Messier added both to his catalogue about three days after Koehler's discovery. ([Wikipedia](#))



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April is great for both viewing and imaging. Spend some time outside with your scope. Winter is here.

For now – Keep looking up.

Darkness – Part III by Mark DiVecchio

This 3 part series talks about darkness, why darkness is important (and not just to astronomers) and what we can do to keep the sky dark.

Acknowledgment: This series was produced with help from the **International Dark Sky Association** www.darksky.org .

Chapter 3 What We Can Do to Keep the Sky Dark

Resolving the light pollution problem is as simple as turning out the lights when possible.

Many municipalities and states are now establishing dark zones for the purpose of creating areas without artificial light. They are doing this for the benefit of both human and wildlife inhabitants. [Light pollution](#) is often ignored when it comes to protecting the environment, but it should be something that is on the top of everyone's list.

Light pollution hinders astronomy, harms the planet, wastes money, and threatens the health and safety of all life.

Light pollution is excessive or inappropriate outdoor lighting. Common forms include:

- Glare – excessive brightness causing visual discomfort
- Urban sky glow –brightening of the night sky
- Light trespass – light falling where it's not intended or needed.

Solutions to light pollution are simple and save money!

What You Can Do

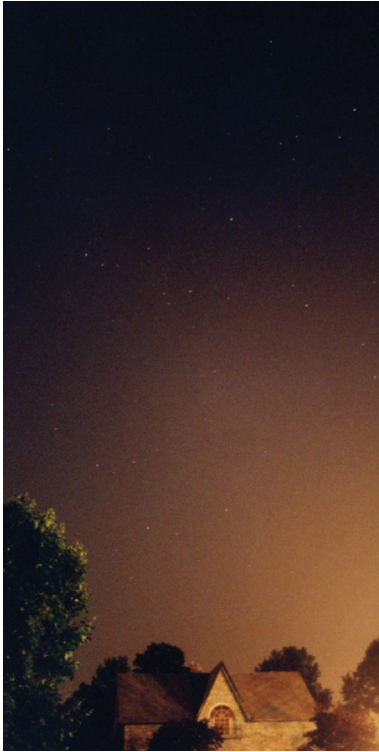
- Use fully shielded, dark-sky friendly fixtures. That means lights shine down, not up.
- Only use lights when needed. Install timers and dimmer switches, and turn off lights when not in use.
- Use the right amount of light. Too much light is wasteful and impairs vision.
- Use long-wavelength lights with a red or yellow tint to minimize negative health effects.

Help Make Change!

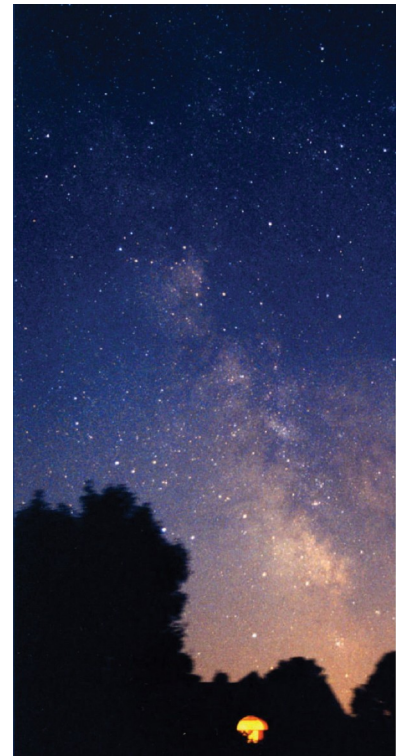
- Get informed. Visit darksky.org to learn more.
- Spread the word. Talk to friends, neighbors and government officials about light pollution.



Photo by Jim Richardson



Before and during the 2003 Northeast blackout. Photos by Todd Carlson.



Protecting the night sky starts with YOU!

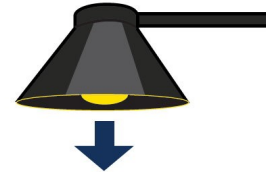
- 1 Light only what you need



- 2 Use energy efficient bulbs and only as bright as you need



- 3 Shield lights and direct them down



- 4 Only use light when you need it



- 5 Choose warm white light bulbs



- 6 Join IDA!
We need your help to continue the fight against light pollution.

**DARK
SKY.
ORG**



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“Losing the Dark”

IDA’s [“Losing the Dark”](#) is a free informative six-minute introduction to light pollution that can either be streamed online or downloaded onto your computer.

Its your turn to do your part to keep the sky dark and to get outside after sunset and enjoy the stars.





Hubble at 30: Three Decades of Cosmic Discovery by David Prosper

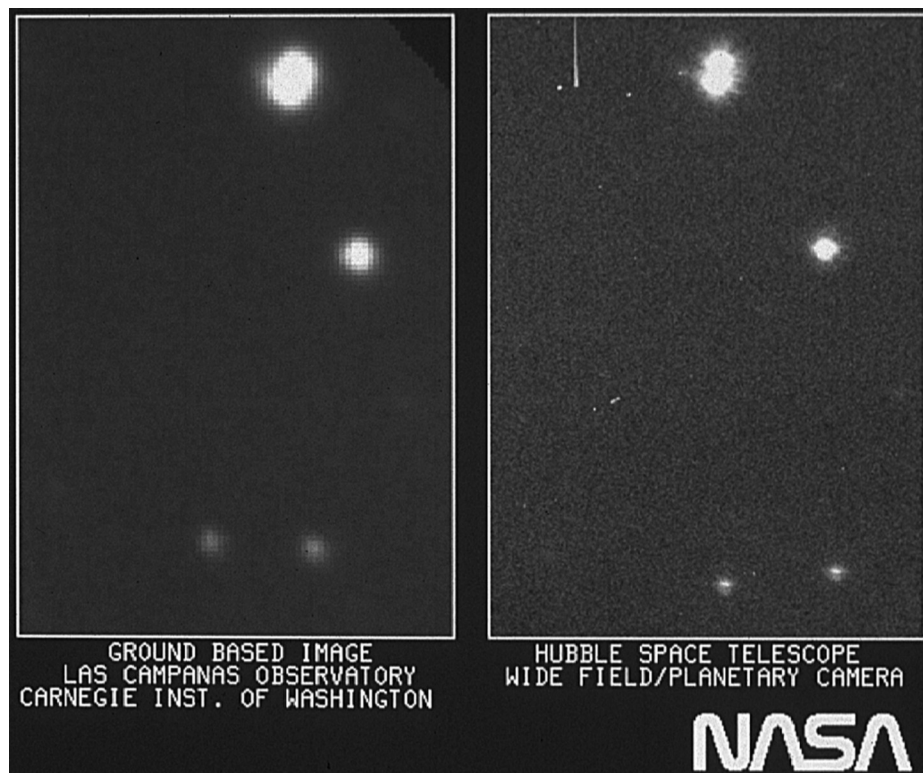
The **Hubble Space Telescope** celebrates its 30th birthday in orbit around Earth this month! It's hard to believe how much this telescope has changed the face of astronomy in just three decades. It had a rough start -- an 8-foot mirror just slightly out of focus in the most famous case of spherical aberration of all time. But subsequent repairs and upgrades by space shuttle astronauts made Hubble a symbol of the ingenuity of human spaceflight and one of the most important scientific instruments ever created. Beginning as a twinkle in the eye of the late Nancy Grace Roman, the Hubble Space Telescope's work over the past thirty years changed the way we view the universe, and more is yet to come!

We've all seen the amazing images created by Hubble and its team of scientists, but have you seen Hubble yourself? You actually can! Hubble's orbit -- around 330 miles overhead -- is close enough to Earth that you can see it at night. The best times are within an hour after sunset or before sunrise, when its solar panels are angled best to reflect the light of the Sun back down to Earth. You can't see the structure of the telescope, but you can identify it as a bright star-like point, moving silently across the night sky. It's not as bright as the Space Station, which is much larger and whose orbit is closer to Earth (about 220 miles), but it's still very noticeable as a single steady dot of light, speeding across the sky. Hubble's orbit brings it directly overhead for observers located near tropical latitudes; observers further north and south can see it closer to the horizon. You can find sighting opportunities using satellite tracking apps for your smartphone or tablet, and dedicated satellite tracking websites. These resources can also help you identify other satellites that you may see passing overhead during your stargazing sessions.

NASA has a dedicated site for Hubble's 30th's anniversary at bit.ly/NASAHubble30. The Night Sky Network's "Why Do We Put Telescopes in Space?" activity can help you and your audiences discover why we launch telescopes into orbit, high above the interference of Earth's atmosphere, at bit.ly/TelescopesInSpace. Amateur astronomers may especially enjoy Hubble's images of the beautiful objects found in both the Caldwell and Messier catalogs, at bit.ly/HubbleCaldwell and bit.ly/HubbleMessier. As we celebrate Hubble's legacy, we look forward to the future, as there is another telescope ramping up that promises to further revolutionize our understanding of the early universe: the James Webb Space Telescope!

Discover more about the history and future of Hubble and space telescopes at nasa.gov.

Image Credit: NASA



Hubble's "first light" image. Even with the not-yet-corrected imperfections in its mirror, its images were generally sharper compared to photos taken by ground-based telescopes at the time. Image Credit: NASA

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 <https://nightsky.jpl.nasa.org> to find local clubs, events, and more!





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The TVA is a member club of [The Astronomical League](#).

