

# THE ASTRONEWS



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November 2022

[www.hawastsoc.org](http://www.hawastsoc.org)

## A word from your editor by Sapavith 'Ort' Vanapraks

As Oahu COVID-19 case count daily average continues to stay high (125+), our HAS monthly meeting will continue to be an online meeting. Our public star party and school star party is also on hold. Let's hope that situation gets better by this summer so we can all go back to a similar life as 2019. At that time, we will announce it on our HAS website and in the AstroNews. Meanwhile, we will continue to have the club member only star party. We will be limiting the club party to the key master and 24 extra members. All attendees must be fully vaccinated. The monthly club meeting is now being done remotely via Zoom. Please check your email and website for an update.

From NASA website. It said that "NASA is targeting the next launch attempt of the Artemis I mission for Monday, Nov. 14 with liftoff of the Space Launch System (SLS) rocket carrying the Orion spacecraft planned during a 69-minute launch window that opens at 12:07 a.m. EST." Let's hope that happens.

The Milky Way Season for 2022 in Hawaii and Northern Hemisphere. The Milky Way (MW) season is from February to October. On February 1st, 2023, MW rises at 04:18 AM and disappears at 05:53 AM due to sunrise. On October 31st, 2023, MW appears at 7:11 PM and sets at 20:49 PM. I took the following photo of MW on Sunday, 10/16/2022, from Makakilo Community

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## Upcoming Events:

- The next Board meeting is Sun., Oct. 30<sup>th</sup> 3:30 PM. **(Zoom Meeting)**
- The next meeting is on Tue., Nov. 1<sup>st</sup> at the Bishop Museum at 7:30 PM. —**Zoom Meeting**
- Bishop Museum's planetarium shows are every 1st Saturday of the month at 8:00 PM **(Online)** [www.bishopmuseum.org/calendar](http://www.bishopmuseum.org/calendar)

## President's Message November 2022

We decided to delay our return to in-person meetings until January (if we don't experience a surge in COVID infections before then that would lengthen the delay). However, we have decided to consider star party requests by schools, etc. Of course, participation, as always, is voluntary, so we will need enough willing telescope operators to volunteer if we are to fulfill such a request. I don't think that will be a problem. We hope to be able to resume our regular public star parties in January as well.

In the meantime, our election is coming up in December. HAS doesn't run without its board members, so please consider running for an office. You're welcome to nominate yourself or someone else at our November meeting. We'll also accept nominations right before the vote at our December meeting. If you're an active, longtime member, maybe now is the time for you to contribute to the running of the club.

Last month we were waiting to see how much the DART mission's impact into Dimorphos, the moon of asteroid Didymos, changed its orbit. Mission managers said that they would consider the experiment a success if the orbital period were shortened by at least 73 seconds, but a far greater shortening of 32 minutes was achieved.

Changing the momentum of a moving object with known mass by impact with another of known mass and at a known relative velocity is a simple physics calculation, so the difference surprised me. Of course, an off-center glancing blow wouldn't have been as effective, but the DART impact seemed well placed. The major unknown of this event, I think, was the rubble pile nature of the target and how that might partition the impact energy. We saw the ejecta plume and the trail of debris following the collision, but it appears that most of the momentum of DART was transferred to Didymos.

This will have made the orbit more eccentric since a near-instantaneous change in momentum changes the orbital height on the opposite side of the orbit. Didymos now approaches

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# Observer's Notebook—November 2022 by Ort

## Planets Close to the Moon Times are Hawaii Standard Time










- Nov 1, 14h, Moon 4.0° SE of Saturn; 99° from Sun in evening sky; magnitudes -10.5 and 0.7
- Nov 4, 2h, Moon 2.88° SE of Neptune; 131° from Sun in evening sky; magnitudes -11.5 and 7.8
- Nov 4, 13h, Moon 2.16° SE of Jupiter; 137° from Sun in evening sky; magnitudes -11.6 and -2.8
- Nov 8, 3h, Moon 0.72° N of Uranus; 179° from Sun in the midnight sky; magnitudes -12.7 and 5.6; occultation
- Nov 11, 4h, Moon 2.48° N of Mars; 144° and 145° from Sun in morning sky; magnitudes -11.7 and -1.5
- Nov 24, 3h, Moon, Mercury, and Venus within circle of diameter 2.27°; about 9° from Sun in evening sky; magnitudes -5, -1, -4
- Nov 24, 4h, Moon 2.27° S of Venus; 9° and 8° from Sun in evening sky; magnitudes -5.0 and -3.9
- Nov 24, 5h, Moon 0.92° S of Mercury; 9° from Sun in evening sky; magnitudes -5.0 and -0.7
- Nov 28, 22h, Moon 4.0° SE of Saturn; 73° from Sun in evening sky; magnitudes -9.5 and 0.8

## Other Events of Interest

### Times are Hawaii Standard Time

- Nov 7, 14h, Full Moon; total eclipse of the Moon
- Nov 8, 6h, Mercury at superior conjunction with the Sun; 1.440 AU from Earth; latitude 0.29°
- Nov 8, 22h, Uranus at opposition in longitude; magnitude 5.6; declination 16.5°
- Nov 12, 4h, Moon at northernmost declination in year, 27.50°
- Nov 17, 6h, Leonid meteors; ZHR 10; 1 day after Last Quarter Moon
- Nov 25, 14h, Moon at perigee; distance 56.88 Earth-radii

## Planets in November

 <h3>Mercury</h3> <p>Poorly placed morning planet at the start of November, poorly positioned evening planet at end.</p>	 <h3>Venus</h3> <p>Too close to the Sun in the evening sky to be seen safely.</p>	 <h3>Mars</h3> <p>Brilliant orange planet. Rises early evening, reaching 60o altitude in dark skies.</p>
 <h3>Jupiter</h3> <p>Bright evening planet. Waxing gibbous Moon near Jupiter on the night of 4/5 November.</p>	 <h3>Saturn</h3> <p>Well placed at the start of the month, losing altitude by the end. Waxing Moon nearby on 1 and 29 November.</p>	 <h3>Uranus</h3> <p>Reaches opposition on 9 November in southern Aries. Should be visible to naked eye.</p>
 <h3>Neptune</h3> <p>Well placed for observation. Mag. +7.9 Neptune and -2.5 Jupiter appear 6.2o apart mid-month.</p>	 <h3>Pluto (Dwarf Planet)</h3> <p>will become visible around 18:44 (HST), 37° above your southwestern horizon, as dusk fades to darkness. It will then sink towards the horizon, setting at 22:11.</p>	 <h3>4—Vesta (Asteroid)</h3> <p>is visible in the evening sky, becoming accessible around 18:44 (HST), 49° above your southern horizon, as dusk fades to darkness.</p>

# Meeting Minutes

H.A.S. Secretary

October 4<sup>th</sup>, 2022 7:30 PM (Zoom Meeting)

Andy Stroble

Meeting called to order at 7:31 pm. By President Chris Peterson. 16 participants were present.

It was noted that the Space Age is now Medicare age.

Minutes of the September meeting were adopted, with corrections.

KL Chin attended for the first time.

Public Star Parties are slated to resume in January. Question of whether to accept school and other organizations requests prior to that was raised, and it seems enough members are willing to participate.

Elections for Board members are to be held at the December meeting. All current board members have consented to stand for re-election, but they are tired, and any nominations from the floor would be welcome. Candidates to be presented at the November meeting.

Bishop Museum has a new Planetarium director, Romeé Gaoiran. Mark will be meeting with her about repairs, new equipment for the Bishop Observatory.

Keymasters are allowed to pass responsibilities to competent board members who wish to stay longer.

Steve Chun presented planetary images, and others, captured by shooting video exposures and stacking the exposures. Images of Saturn were quite amazing, as well as lunar photos and one of M13.

At-large Board member Marufa reported on the NASA Space Apps Challenge, and the local entry, concentrating on predicting solar flare events with AI.

President Chris shared some video of the DART mission impacts on Dimorphos.

Peter shared views of Europa taken by Juno on her last close pass. And news that the Indian MOM (Mars Orbiter Mission) ended its expected 6-month lifespan after some eight years.

Meeting was adjourned at 9:13 pm. There were 19 participants, at maximum.

Faithfully and dutifully submitted, James Andy Stroble, Secretary.

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Dimorphos more closely at periapsis (assuming the orbit was fairly circular before). Now we await the ESA's follow-up mission to observe what kind of crater this event left.

**Hawaiian Astronomical Society  
Event Calendar**

November 2022							
Oct	November 2022						Dec
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
30 BoD Meeting Zoom 3:30 PM	31	1 Club Meeting Zoom 7:30 PM	2	3	4	5	
6 Daylight Saving Time Ends	7	8 Election Day  Full Moon 1:02 AM	9	10	11 Veterans Day	12	
13	14	15	16  3rd Qtr 3:27 AM	17	18	19 Club Party Dillingham Airfield Sunset 5:48 PM	
20	21	22	23  New 12:57 PM	24 Thanksgiving Day	25	26 Club Party Dillingham Airfield Sunset 5:48 PM	
27	28	29	30  1st Qtr 4:36 AM	Notes:			

**<<Upcoming Star Parties>>**

- Club Party-Dillingham November 19 —7:00 PM**
- Club Party Dillingham November 26 —7:00 PM**
- Public Party Geiger/Kahala November 5 — CANCELLED**

Upcoming School Star Parties


# NASA's Night Sky Notes

## Cepheus: A House Fit for a King

By David Prosper



Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of Cepheus for the first time. These stars represent Cepheus, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original **Cepheid Variable**.

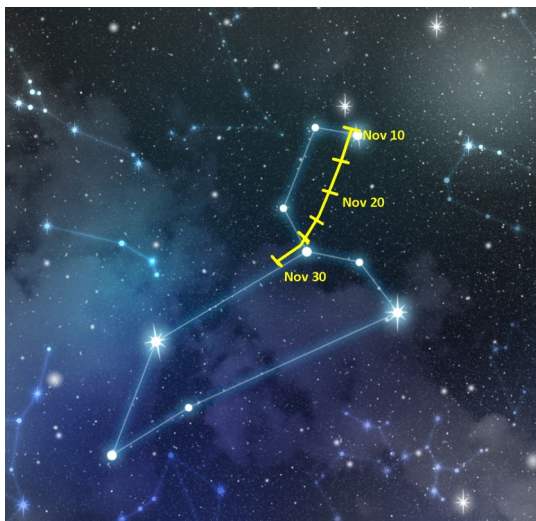
Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the “Garnet Star” Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the “Fireworks Galaxy” NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star **Delta Cephei**. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a cycle of where it dims and then brightens). Once the period for a Cepheid Variable (or **Cepheid**) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called “Leavitt’s Law.” So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid’s distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this “nebula” was actually another galaxy outside of our own Milky Way! You may now know this object as the “Andromeda **Galaxy**” or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

Because of their importance as a “standard candle” in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was even studied in detail by Edwin Hubble’s namesake telescope, NASA’s Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA’s Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA’s latest observations of stars and galaxies across our universe at [nasa.gov](http://nasa.gov).

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There are three minor showers and one “major” shower (Leonids) in November. The Leonids are in an off year and expected to produce a maximum of 15 meteors per hour per the American Meteor Society (10 ZHR per the International Meteor Organization). Observers typically see meteors that come from earlier returns of comet 55P/Tempel-Tuttle. Each off year also presents an opportunity to see meteors from old debris fields which are numbered. In 2022, model calculations of Maslov (2007) and Sato (2021) show an approach of the 1733 dust trail on November 19. An encounter with the 1600 trail (weak rate possible near November 18, is found by Vaubaillon (2021). A weak rate enhancement may be visible due to the 1800 trail later on November 21, (Maslov, 2007). The Leonids are often bright meteors with a high percentage of persistent trains.



Leonid meteor shower radiant in November 2022. Background image courtesy of Viralzergnet

### Phases of the Moon (courtesy timeanddate.com)

<b>First Quarter</b>	<b>Full Moon</b>	<b>Last Quarter</b>	<b>New Moon</b>
November 30	November 08	November 16	November 23

Shower	Activity	Maximum		Radiant		$V_{\infty}$ km/s	$r$	ZHR
		Date	$\lambda_{\odot}$	$\alpha$	$\delta$			
<a href="#">Northern Taurids</a> (017 NTA)	Oct 20 - Dec 10	Nov 12	230°	58°	+22°	29	2.3	5
Leonids (013 LEO)	Nov 06 - Nov 30	Nov 17	235.27°	152°	+22°	71	2.5	10
$\alpha$ -Monocerotids (246 AMO)	Nov 15 - Nov 25	Nov 21	239.32°	117°	+01°	65	2.4	Var
Nov. Orionids (250 NOO)	Nov 13 - Dec 06	Nov 28	246°	91°	+16°	44	3.0	3

If you're not out watching meteors, set up your phone to be “red” safe! For more info: Thomas Giguere, 808-782-1408, Thomas.giguere@yahoo.com; Mike Morrow, PO Box 6692, Ocean View, HI 96737.

# Cash Flow - 9/11/2022 to 10/10/2022

<b>Beginning Balance</b>	\$4,719.69
<b>Money into selected accounts comes from</b>	
Donation	\$20.00
Membership - Electronic	\$100.00
Membership - Family	\$4.00
Membership - Paper	\$26.00
Subscription - Astronomy	\$34.00
<b>Total Money In</b>	<b>\$184.00</b>
<b>Money out of selected accounts goes to</b>	
Insurance	\$323.00
<b>Total Money Out</b>	<b>\$323.00</b>
Difference	\$-139.00
<b>Ending Balance</b>	<b>\$4,580.69</b>

Here are the financials up through October 10.

As mentioned before, the insurance bill was paid.

Thanks to everyone who paid, renewed, and donated.

Covid numbers are all over the map, with the New York Times reporting a more than tripling of Covid rates in Hawaii, and the Hawaii Health Department hovering just over 100 cases per day for Oahu. That said, as of today the 7 day average has risen to 116. The weekly number for Oahu is 877. Dividing by 7 gives you a daily average of 125. I'm not sure what formula the health department uses to determine the 7 day average. Hospitalizations and deaths remain low.

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### NASA's SpaceX Crew-5 Mission Casts Long Exposure Light Beam

In this twenty-second exposure, a SpaceX Falcon 9 rocket carrying the company's Crew Dragon spacecraft is launched on NASA's SpaceX Crew-5 mission to the International Space Station at NASA's Kennedy Space Center in Florida.

Image Credit: NASA/Joel Kowsky



## Facing North October Evenings



The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: [stellarium.org](http://stellarium.org).

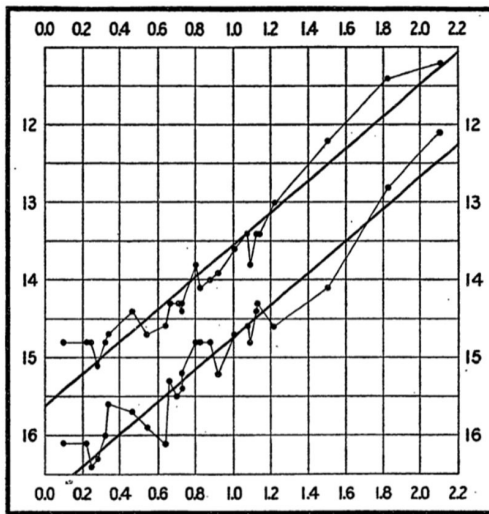


FIG. 2.

This historical diagram from Henrietta Leavitt's revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering's 1912 paper, "Periods of 25 Variable Stars in the Small Magellanic Cloud," a copy of which can be found at: <https://ui.adsabs.harvard.edu/abs/1912HarCi.173...1L/abstract>



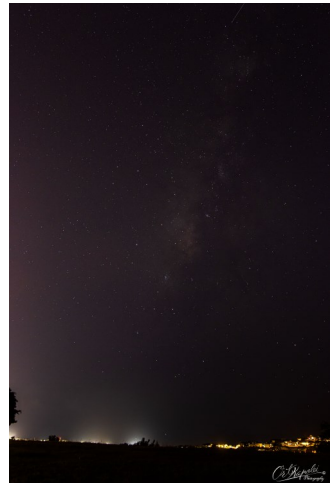
**Safe Return for NASA's SpaceX Crew-4 Astronauts**

Support teams work around the SpaceX Crew Dragon Freedom spacecraft shortly after it landed with NASA astronauts Lindgren, Hines, Watkins, and ESA astronaut Cristoforetti aboard in the Atlantic Ocean off the coast of Jacksonville, Florida, Oct. 14, 2022.

Image Credit: NASA/Bill Ingalls

*(Continued from page 1) - word from your editor*  
 Park. MW was already heading toward setting. Let's hope we get many clear nights for MW shots next season.

By Tuesday, November, 8, 2022, people from Russia, Japan, New Zealand, Canada, Alaska, and our Hawaii will get to observe the Total Lunar Eclipse. The lunar Eclipse in Hawaii started on Monday, November 7, 2022, at 10:02 PM. Maximum Eclipse will happen on Tuesday, November 8, 2022, at 12:59 AM and ended at 3:56 AM. Hope some of us get to enjoy it. Show us your photos in the meeting.



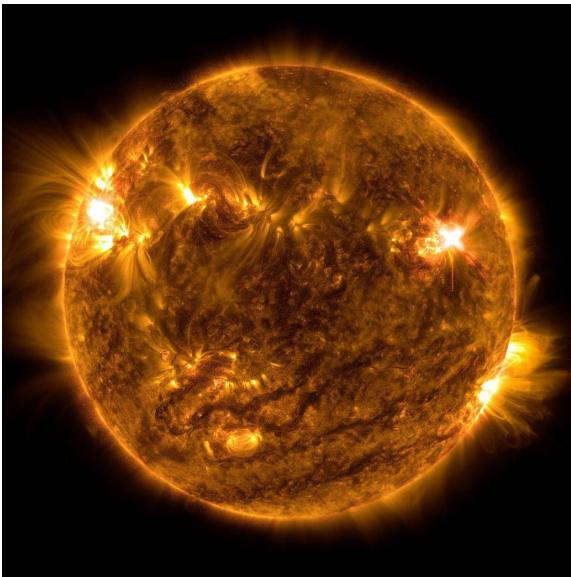
Time	Event	Direction	Altitude
Mon, Nov 7 11:09:00 PM	Partial Eclipse begins	105°	74.3°
Tue, Nov 8 12:16:00 AM	Total Eclipse begins	189°	85.3°
Tue, Nov 8 12:59:00 AM	Maximum Eclipse	248°	78.4°
Tue, Nov 8 1:41:00 AM	Total Eclipse ends	261°	69.0°
Tue, Nov 8 2:49:00 AM	Partial Eclipse ends	270°	53.7°



### Hubble Snaps a Pair of Interacting Galaxies

The two interacting galaxies making up the pair known as Arp-Madore 608-333 seem to float side by side in this image from the NASA/ESA Hubble Space Telescope. Though they appear serene and unperturbed, the two are subtly warping one another through a mutual gravitational interaction that is disrupting and distorting both galaxies. Hubble's Advanced Camera for Surveys captured this drawn-out galactic interaction.

Image credit: ESA/Hubble & NASA, Dark Energy Survey/Department of Energy/Fermilab/Dark Energy Camera (DECam)/Cerro Tololo Inter-American Observatory/NOIRLab/AURA



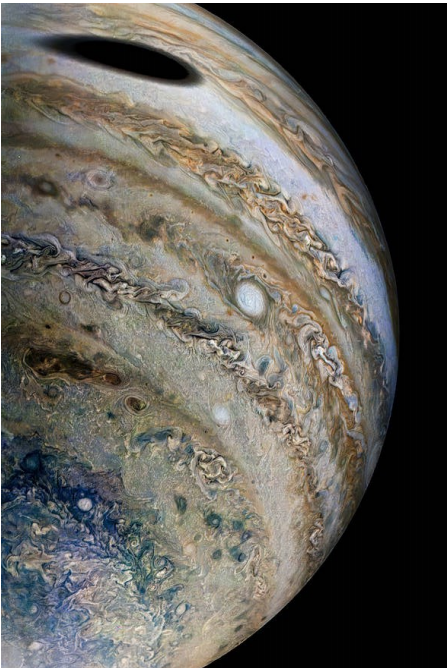
### Sun Rings in New Month with Strong Flare

The Sun is gold with a mottled, swirling surface. Glowing particles burst out from the edge on the lower right and most of the upper left against the black background of space

Image Credit: NASA/SDO



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### **Jupiter in Ganymede's Shadow**

NASA's Juno spacecraft captured this view of Jupiter during the mission's 40th close pass by the giant planet on Feb. 25, 2022. The large, dark shadow on the left side of the image was cast by Jupiter's moon Ganymede.

Image Credit: NASA/JPL-Caltech/SwRI/MSSS; Image processing: Thomas Thomopoulos © CC BY SA