The Astronews

HUI KILOLANI

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President's Message

Note : Occasionally due to lack of space (no pun intended) the President's Message will begin here. Like now.

Astronomers have always been explorers. While terrestrial explorers generally transport their bodies to lesser-known places to discover new things, astronomers use telescopes to, in essence, bring objects of interest closer to us so that we can observe them better. Now we have spacecraft that can go where humans so far can't. They extend the reach of our senses as telescopes do but to a far greater degree.

NASA's solar system exploration efforts have matured into a system of different classes of spacecraft. "Flagship" missions, such as Cassini and the Mars Science Laboratory (Curiosity), are expensive, usually multi-year, multi-instrument missions initiated by NASA headquarters. They are designed to tackle big, fundamental questions. "Discovery" class missions are another story. These lower-cost missions are proposed by teams of researchers. Some proposals are chosen for further development, and finally a single mission is selected. Selection is based on cost, likelihood of success, and contributions to NASA's highest science

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Inside this issue:

Upcoming Events:

The next meeting is on Tuesday October 4th at the Bishop Museum 7:30 PM.

- Bishop Museum's planetarium shows are every Saturday of the month at 8:00 PM www.bishopmuseum.org/calendar
- The next Board meeting is Sun., Oct. 2nd 3:30 PM in POST building at UH.

President's Message October 2016 (Cont'd)

(Continued from page 1) (President's Message)
objectives among other things. The Planetary Science community has begun developing sets of science priorities in Planetary Science Decadal Surveys, most recently produced in 2011, and these now factor into the selection process. MESSENGER, Dawn, and Kepler are examples of Discovery missions.

Five mission proposals made the first cut in the current Discovery cycle. One mission would study the atmosphere of Venus as it descends to the surface. Another would study Venus from orbit. One would search for potentially hazardous near-Earth objects. One would look at Jupiter's Trojan asteroids. The final candidate would study the metal asteroid 16 Psyche. This is almost certainly the core of an asteroid that has been stripped of most or all of its mantle and crust. Recent research suggests that there are several different possible mechanisms of core formation in solar system bodies. Since it is unlikely that we will ever be able to sample Earth's core directly, visiting the exposed core of an asteroid would surely advance our understanding of core formation processes.

One can argue whether this type of planetary exploration is technically astronomy or not, but that's just a semantic question. Those of us who look through telescopes are always wanting closer views. Spacecraft provide the best views we'll get until we can visit in person.

Chris Peterson

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The Astronews is the monthly newsletter of the Hawaiian Astronomical Society. Some of the contents may be copyrighted. We request that authors and artists be given credit for their work. Contributions are welcome. Send them to the Editor via e-mail. The deadline is the 15th of each month. We are not responsible for unsolicited artwork.

Observer's Notebook—October 2016 by Jay Wrathall

Planets Close To the Moon
Times are Hawaii Standard Time

Oct 3,10h, M 4.9° NNE of Venus
(31° from sun in evening sky)
Oct 5, 23h, M 3.8° N of Saturn
(59° from sun in evening sky)
Oct 8, 02h, M 7.0° N of Mars
(82° from sun in evening sky)
Oct 12,19h M 1.1° NNW of Neptune
(139° from sun in evening sky)
Oct 15, 17h, M 2.7° SSE or Uranus
(177° and 179° from sun in midnight sky)
Oct 28, 01h, 05h, M 1.4° NNE of Jupiter
(25° from sun in morning sky)

Mercury does not pass close to the moon this month.

Other Events of Interest
Times are Hawaii Standard Time

Oct 1, 00:11h, New Moon
Oct 8, Fall Astronomy Day
Oct 15, 01h, Uranus at opposition
Oct 15, 18:23h, Full Moon
Oct 20, 15h Dwarf planet 1 Ceres at opposition
Oct 21, Orionid meteors
Oct 23, 03h, Asteroid 18 Malponene at opposition
Oct 27, 06h, Mercury at superior conj. with sun
(Passes into evening sky))

Planets in October

Mercury ☿

is visible in the dawn twilight during the first week of October

Venus ♀

is low in the western sky after sunset.

Mars ♂

Can be viewed in the southwest in the evening. It is now at positive magnitude and is dimming rapidly.

Jupiter ♃

rises shortly before the sun.

Saturn ♄

still well positioned for viewing in the western evening sky

Uranus ♅

reaches opposition this month, so is in the sky all night. Best viewed near midnight.

Neptune ♆

- is in the eastern sky at sunset and can be observed most of the night.

1-Ceres (Dwarf Planet)

Reaches opposition on Oct 20 at magnitude +7.4, so is in the sky all night.

18 Melpomene (Asteroid)

Reaches opposition on Oct 23 at magnitude +8.0.

HAWAIIAN ASTRONOMICAL SOCIETY
GENERAL MEMBERSHIP MEETING
September 6, 2016

President Chris Peterson called the September 6, 2016 meeting of the Hawaiian Astronomical Society to order at 7:32 p.m. The meeting was held in Planetarium, on the grounds of the Bishop Museum, Honolulu, Hawaii. There were eighteen members in attendance.

Hawaii Space Lecture Series – This month the Hawaii Space Lecture Series will present a free lecture, ESA's Rosetta Mission: Two Years Riding with a Comet. The featured speaker will be Dr. Peter Mouginis-Mark, from PTPDC, University of Hawaii, Manoa. The lecture will take place Tuesday, September 27,2016 at 7:30 pm. Regular lectures usually take place at the NASA Pacific Regional Planetary Data Center, room 544 in the Pacific Ocean Science and Technology Building on the Manoa campus of the University of Hawaii. Should you be interested in upcoming lectures or for information you can contact NASA PRPDC at 808-956-3132 or on the Web go to http://www.higp.hawaii.edu/prpdc.

Observing: President Chris Peterson spoke briefly outlining some of the finer points of the Rosetta mission. Further discussions touched on Osiris Rex, a mission to an asteroid, which will see an early landing window arriving in 2018, sampling the material found there, and the returning to Earth in 2023. Other matters discussed touched on the recent discovery of an earth-like planet orbiting Proxima Centauri. Chris also spent some time in discussing Einstein's version of the "Twin Paradox" scenario.

There was also a short discussion of nuclear fuel for space flights and its effects.

Telescope Rentals – Our 6" gold telescope has been returned and is available for member rentals. This is a great opportunity for those members who would like to be more active in the club to rent an easily usable telescope for the novice astronomer. Rent it; bring it to a club star party, and our veteran astronomers will help you "get your toes wet", so to speak. Take a chance on having the time of your life.

Star Party Report – Star Party Coordinator Mark Watanabe spoke briefly regarding the September 9, 2016 school star party at Hawaii Baptist Academy from 6:30 pm 'til about 8:30 pm. Chris Peterson will be a featured speaker inside, while our astronomers will be out on the basketball court. It may be a bit hard because they are fighting a full moon.

Other upcoming school events are:

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October 2016

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
25	26	27	28	29	30	1
2 sunset 18:18	3	4 7:30 PM Club Meeting	5	6	7	8 5:55 PM Public Star Party(G) 5:55 PM Public Star Party(K)
9 sunset 18:11	10	11	12	13	14	15
16 sunset 18:06	17	18	19	20	21 8:00 PM Globe at Night	22 8:00 PM Globe at Night 5:45 PM Public Star Party(D)
23 sunset 18:00 8:00 PM Globe at Night	24 8:00 PM Globe at Night	25 8:00 PM Globe at Night	26 8:00 PM Globe at Night	27 8:00 PM Globe at Night	28 8:00 PM Globe at Night	29 8:00 PM Globe at Night 5:40 PM Club Star Party(D)(Private)
30 sunset 17:56 8:00 PM Globe at Night	31 8:00 PM Globe at Night					

☐☐Upcoming Star Parties☐☐

Public Party-Dillingham October 22 Andy Stroble
Public Party Geiger October 8
Public Party Kahala October 8

Upcoming School Star Parties

(Continued from page 4) Meeting Minutes

Oct 6 – Punahou School

Oct 7 – Assets School on Ohana Nui Way, off of Nimitz Highway.

Our September 3rd Dillingham Airfield Star Party for the public was cancelled due to the threat of a hurricane.

Upcoming Events: Saturday, October 29, 2016 at Punahou School will be the location of this year's annual Lacy Veach Day of Discovery. We have had members sign up to help during the event.

October 8, 2016 is the next scheduled suburban star party at Kahala Community Park in East Honolulu and Geiger Park out in Ewa Beach. It is also the date of the International Observe the Moon Night. So come out and join us to become a "lunatic" and observe the moon in all its glory.

Astronews News – The club is discussing the possibility of utilizing a mobile friendly format for our publication, the Astronews.

Dues News – Chris Peterson started a discussion about the reasons the HAS Board feels that a raise in clubs may be in the offing. Suggestions for the increase were to continue the $20/year membership fee for those members who would take the online version of the Astronews, while those who would like to continue receiving a hard copy of the Astronews would have their dues increase to $25/year. Student fees would be $12 and $15 respectively. Reasons for the increase were listed as expenses for mailing of the Astronews, monthly refreshments, complementary dinners for guest speakers, and equipment upgrades and purchases. We will continue this discussion through to the December meeting when a vote by the attending members will be taken.

Perseid Meteor Showers – A few groups were out to view the Perseid meteor showers. Tom Giguere spoke about his groups outing at Mona Farms. Some reports came in from Wyoming. Paul Lawler said he set up to view at the Kahala Park location and Sue Girard, Gretchen West, and April Lew took up their spot at Hunakai Park. Most were satisfied with their viewing.

New Ideas for Star Parties – In a effort to get more people to come to our star parties, Chris Peterson will be conducting discussions on conducting special equipment demonstrations at star parties. Such demonstrations will help members become more familiar with eyepieces and other equipment. We will have further discussions at the October and November meetings.

Pot Luck Supper - We will be having a Pot Luck Supper prior to the December 2016 General Membership meeting. There will be a sign up sheet at the October meeting, for all those who would like to participate. Pencil it

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There is this great idea that if you look hard enough and long enough at any region of space, your line of sight will eventually run into a luminous object: a star, a galaxy or a cluster of galaxies. In reality, the universe is finite in age, so this isn't quite the case. There are objects that emit light from the past 13.7 billion years—99 percent of the age of the universe—but none before that. Even in theory, there are no stars or galaxies to see beyond that time, as light is limited by the amount of time it has to travel.
But with the advent of large, powerful space telescopes that can collect data for the equivalent of millions of seconds of observing time, in both visible light and infrared wavelengths, we can see nearly to the edge of all that's accessible to us.

The most massive compact, bound structures in the universe are galaxy clusters that are hundreds or even thousands of times the mass of the Milky Way. One of them, Abell S1063, was the target of a recent set of Hubble Space Telescope observations as part of the Frontier Fields program. While the Advanced Camera for Surveys instrument imaged the cluster, another instrument, the Wide Field Camera 3, used an optical trick to image a parallel field, offset by just a few arc minutes. Then the technique was reversed, giving us an unprecedentedly deep view of two closely aligned fields simultaneously, with wavelengths ranging from 435 to 1600 nanometers.

With a huge, towering galaxy cluster in one field and no comparably massive objects in the other, the effects of both weak and strong gravitational lensing are readily apparent. The galaxy cluster—over 100 trillion times the mass of our sun—warps the fabric of space. This causes background light to bend around it, converging on our eyes another four billion light years away. From behind the cluster, the light from distant galaxies is stretched, magnified, distorted, and bent into arcs and multiple images: a classic example of strong gravitational lensing. But in a subtler fashion, the less optimally aligned galaxies are distorted as well; they are stretched into elliptical shapes along concentric circles surrounding the cluster.

A visual inspection yields more of these tangential alignments than radial ones in the cluster field, while the parallel field exhibits no such shape distortion. This effect, known as weak gravitational lensing, is a very powerful technique for obtaining galaxy cluster masses independent of any other conditions. In this serendipitous image, both types of lensing can be discerned by the naked eye. When the James Webb Space Telescope launches in 2018, gravitational lensing may well empower us to see all the way back to the very first stars and galaxies. If you're interested in teaching kids about how these large telescopes

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Meteor Log—October 2016

by Tom Giguere

As we look forward to the showers in the last quarter of 2016, we see that the significant showers (Orionids, Leonids, Geminids) are all badly affected by moonlight. This month the Orionids peak during a 20-day old Moon (1 day before last quarter), which will interfere with optical observations.

This month the featured shower is the October Camelopardalids (281 OCT). This shower is not listed in the table below. Short-lived video outbursts were recorded in 2005 and 2006 on October 5/6 (near $\lambda\odot 193^\circ$) from a north-circumpolar radiant at $\alpha \approx 166^\circ$, $\delta \approx +79^\circ$. The meteors showed an atmospheric velocity of 47 km/s. If the active interval remains the same, parts of it should be best-observed from western Asia further westwards to Europe. Esko Lyytinen has pointed out that the case of the October Camelopardalids is not quite clear: "it seems that the orbit is of long period nature. After the

(Continued on page 10)

First Quarter	**Full Moon**	**Last Quarter**	**New Moon**
October 9	October 16	October 22	October 30

Shower	**Activity**	**Maximum**		**Radiant**		V_∞	*r*	**ZHR**
		Date	$\lambda\odot$	**α**	**δ**	**km/s**		
Draconids (009 DRA)	10/06→ 10/10	Oct 08	195.4°	262°	+54°	20	2.6	Var
Southern Taurids (002 STA)	09/10→ 11/20	Oct 10	197°	32°	+09°	27	2.3	5
δ-Aurigids (224 DAU)	10/10→ 10/18	Oct 11	198°	84°	+44°	64	3.0	2
ε-Geminids (023 EGE)	10/14→ 10/27	Oct 18	205°	102°	+27°	70	3.0	3
Orionids (008 ORI)	10/02→ 11/07	Oct 21	208°	95°	+16°	66	2.5	15
Leo Minorids (022 LMI)	10/19→ 10/27	Oct 24	211°	162°	+37°	62	3.0	2

Ever see a daylight meteor? Rare, but possible! For more info contact: Tom Giguere, 808-782-1408, Thomas.giguere@yahoo.com; Mike Morrow, PO Box 6692, Ocean View, HI 96737.

Treasurer's Report

by April Lew

HAS Financial Report August 16 –September 15 2016			
Beginning Balance			1,018.17
Income:			
	Dues Received	58.00	
	Donation	53.05	
	Astronomy Magazine	34.00	
	Sky and Telescope	32.95	
Total Income			178.00
Expenses:			
	Sept. Astronews printing & mailing	108.10	
	Insurance	320.00	
	Astronomy Magazine	34.00	
	Sky and Telescope	32.95	
Total Expenses			495.05
Ending Balance			701.12

We welcome two new member this month. They are **Keona and Sean Blanks**.

Many thanks to those renewing their membership (Peter Besenbruch, Don A. Poole and Cynthia Lee, and Larry and Irma Sandbo)

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As a reminder, please check your membership anniversary date listed on the Astronews address label. Clear skies to all!

2017 CALENDARS Available!!!!

The "Deep Space Mysteries" calendar presented by Astronomy Magazine, extra large size: 13" by 23' opened, is filled with stunning images of stars, planets, galaxies, and other deep space wonders, with highly informative essays accompanying each photograph. They are available at a discount through our club for only $6.50! Treasurer April Lew will be accepting orders for the 2016 calendars: $6.50 each, cash or check, at the October HAS meeting, or mail your order by Oct 10 with check made out to "Hawaiian Astronomical Society" To: Hawaiian Astronomical Society, P.O. Box 17671, Honolulu, HI 96817.

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(Continued from page 6) Meeting Minutes
in on your calendars and consider what you will bring to help us celebrate the holiday season. The supper will be held in the Activity room adjacent to the Planetarium.

Swap Meet – President Chris Peterson continued a discussion as to whether we will hold a swap meet prior to an upcoming general membership meeting. A general consensus was a feeling that a swap meet should be held during a month when there is no conflict.

Peter's Show & Tell – Vice-President Peter Besenbruch presented a Power Point presentation on the following:

a. Space – discussion of the larger structure of the universe.

b. Venus-like object – GT1132B, an object 39 light-years distant from Earth, a hot O^{2-} rich environment.

c. Mars = Pictures of an inverted channel, like a fossilized riverbed on Earth, seen on Mars. Such a structure may indicate that Mars once had a water rich environment.

d. CO Hunting – Radio telescope at ALMA in the Atacama Desert have posited that large stars appear to have large amounts of Carbon Monoxide.

e. Comet 67B – The Rosetta missions have finally pinpointed space probe that "landed" or bounced its way around Comet 67B. The probe has been disabled.

f. Juno spacecraft – This spacecraft has take images of the northern pole.

g. Mauna Loa – The simulation of a mission to Mars identified isolation as a psychological obstacle.

h. A Story of the development of the universe.

i. "Pandora" discovered – The satellite of Proxima Centauri B is most likely a potato shaped object.

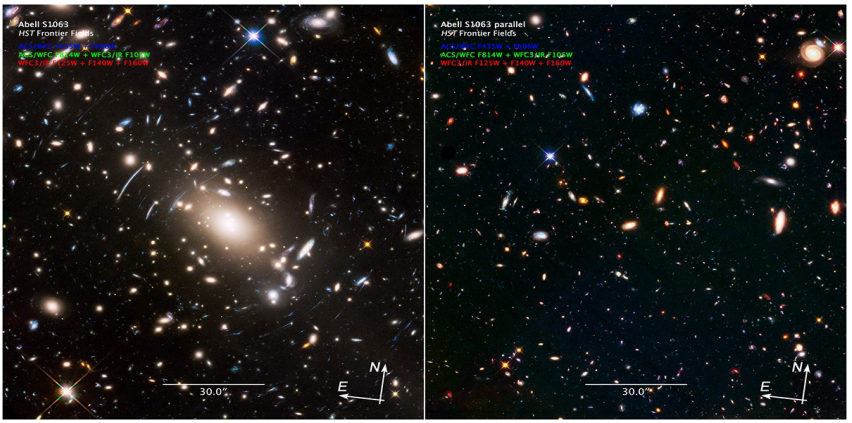
Mahalo – As there was no further business, the meeting was adjourned at 9:05 p.m. Members adjourned to look at the night skies on the observing deck. Post meeting goodies were available in the rotunda.

Respectfully Submitted

Gretchen West

(Continued from page 8) Meteor Log Tom Giguere
2005 observation was concluded to be an outburst of the 1-revolution trail, while it now appears to be an annual shower. Either this trail is a lot wider than a typical long period 1-revolution trail, or we have not yet encountered the trail center. In 2016 the calculated trail position is similar to 2005. The level of activity should be the same (but probably not much stronger) as in 2005. predicted position is at $\lambda\odot 192.56^{\circ}$, corresponding to 2016 October 5, 14h45m UT."

(Continued from page 7) Space Place
"see," be sure to see our article on this topic at the NASA Space Place: http://spaceplace.nasa.gov/telescope-mirrors/en/



Galaxy cluster Abell S1063 (left) as imaged with the Hubble Space Telescope as part of the Frontier Fields program. The distorted images of the background galaxies are a consequence of the warped space dues to Einstein's general relativity; the parallel field (right) shows no such effects. Image credit: NASA, ESA and Jennifer Lotz (STScI)

(Continued from page 10) Meteor Log Tom Giguere

The Draconid (009 DRA) shower has its maximum on October 8, which occurs together with the first quarter moon. There are no predictions for any Draconid rate enhancement in 2016. The δ-Aurigids (224 DAU), has its peak maximum on October 11 in the morning hours when the radiant is highest in the sky. The moon is two days past first quarter, thus not a factor for morning viewing.

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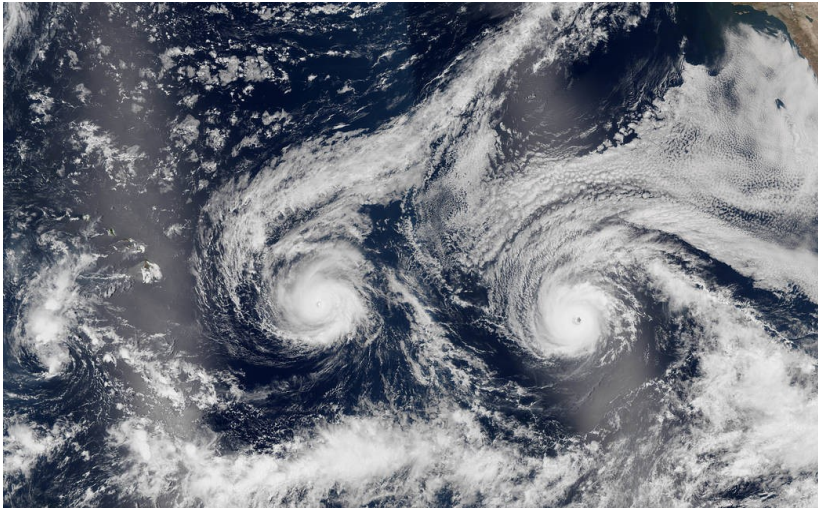

Hurricanes Madeline and Lester The island of Hawaii rarely takes a direct hit from a hurricane. This week, two Pacific storms are lining up to change that. This natural-color image of Hurricane Madeline and Hurricane Lester is a composite built from two overpasses by the Visible Infrared Imaging Radiometer Suite on the Suomi NPP satellite on August 29, 2016.