The Astronews

HUI KILOLANI

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Speaker for March and some miscellanea by Charles Rykken

Nienke van der Marel (http://www.ifa.hawaii.edu/~nmarel/) at the IFA will be speaking for the March meeting. As she says on her web page "My thesis is titled "Mind the gap; gas and dust in planet-forming disks" (available for download here -> https://www.strw.leidenuniv.nl/events/phdtheses/nmarel/) and focuses on the structure of gas and dust in transitional disks, using millimeter interferometry data with the Atacama Large Millimeter Array (ALMA)." Hopefully, she will talk on that subject.

Chris Peterson, in his President's Message talks about the new maybe planet X and I thought apointer to the URL on Science magazine might be helpful (http://www.sciencemag.org/news/2016/01/feature-astronomers-say-neptune-sized-planet-lurks-unseen-solar-system).

There are some very nice graphics that make it quite clear that planet X is really far out man. Sorry, that sixties thing pops up in the most unexpected places.

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Upcoming Events:

The next meeting is on Tuesday, Feb. 2nd 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., Jan. 31st 3:30 PM in POST building at UH.

President's Message
February 2016

You have probably heard reports of the discovery of a new planet in our solar system. That's not quite correct (yet), but there is evidence that points toward the existence of such a planet. Mike Brown, who discovered Eris (the Kuiper belt object that caused the IAU to consider what a planet is and reclassify Pluto as a dwarf planet) and Konstantin Batygin have published the evidence and their conclusions.

The primary evidence is that six Kuiper belt objects have elliptical orbits that all have perihelia near the ecliptic plane and in the same general region. This is easiest to explain if the purported planet ("Planet Nine"), which should have a mass about ten times that of Earth, or about half that of Neptune, was perturbed into a very elliptical orbit by a gravitational interaction (perhaps with Jupiter).

During one of Planet Nine's passages through the Kuiper belt, it had another gravitational interaction, this time with one of the Kuiper belt objects that are evidence for its existence. This changed the perihelion of Planet Nine, and it no longer comes closer to the Sun than about 300 A.U. Further interactions with Kuiper belt objects produced the family of objects previously mentioned.

Planet Nine would still be in a very elliptical orbit. Since objects move slowest when farthest from perihelion, Planet Nine would spend most of its time very far from the Sun. It might have a magnitude of about 22. There's a lot of uncertainty in its orbit and no way to know what part of the orbit it's in now. There is a general idea of the shape of the orbit, though, so searches will be made to find the new planet. Brown hopes it can be found within five years.

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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—February 2016 by Jay Wrathall

Planets Close To the Moon
Times are Hawaii Standard Time

Feb 1 00h, M 2.7° NNE of Mars
(87° from sun in morning sky)
Feb 3, 09h, M 3.5° N of Saturn
(60° from sun in morning sky)
Feb 5 21h, M 3.5° N of Venus
(30° from Sun in morning sky)
Feb 6, 06h, M 3.8° N of Mercury
(26° from sun in morning sky)
Feb 9, 13h, M 2.0° NNW of Neptune
(18° from sun in evening sky)
Feb 12, 05h, M 1.6° SSE of Uranus
(54° from sun in evening sky)
Feb 23,14h, M 1.6° SSW of Jupiter
(165° from sun in morning sky)
Feb 29 10h, M 3.5° NNE of Mars
(103° from sun in morning sky)

Other Events of Interest
Times are Hawaii Standard Time

Feb 2, Candlemas or Groundhog day
(One of 4 cross-quarter days, between solstices and equinoxes.)
Feb 6, 15h,Mercury at greatest elongation
(25.5° west of the sun in morning sky)
Feb 6, 15h, moon 0.61° S of Asteroid 18 Melpomene
(18° from sun in evening sky)
Feb 8, 04:39h, New Moon
Feb 12, 17h, Mercury 4.0° E of Venus)
(25° and 29° from sun in morning sky)
Feb 22, 08:20h, Full Moon
Feb 28, 06h, Neptune at conjunction with sun

Planets in February

Mercury
☿ may be viewed in the morning twilight early in the month

Venus
♀ shines brightly in the morning sky, at about magnitude -4.0.

Mars
♂ rises about midnight and can be viewed in the morning sky

Jupiter
♃ rises well before midnight in February and is well placed for viewing late in the evening.

Saturn
♄ is above Venus in the eastern sky before dawn.

Uranus
♅ is low in the southwestern sky after sunset.

Neptune
♆ reaches conjunction with sun this month and is too close to the sun for viewing.

18 Melpomene
is very close to the moon on Feb 6. Will reach conjunction with sun later in the year.

Pluto (Dwarf Planet)
♇ is low in the eastern sky before sunrise, close to Venus and Mercury.

January 5, 2016

President Chris Peterson called the January 5, 2016 meeting of the Hawaiian Astronomical Society to order at 7:33 p.m. The meeting was held in Planetarium, on the grounds of the Bishop Museum, Honolulu, Hawaii. There were twenty-eight members and at least two visitors in attendance.

Help Bishop Museum – Chris Peterson started the meeting asking that members sign up to help out the Bishop Museum by running the museum scope on January 16, 2016. A sign-up was passed around the room.

Visitors – Chris welcomed our two visitors to the meeting. Jameeka Marshall, a former Mauna Kea complex worker, is now teaching in Waianae. She is interested in bringing astronomy into the classroom. Nalu Clemens, a student at Kaiser High School, is interested in learning more about observing. We welcome all who wish to learn more about the skies overhead.

Star Party Report – Calvin Olivera reported that there are no school star parties for the month of January. However, we do have two school star parties for the month of February. They are as follows:

February 5 - Waialua Elementary and Intermediate School - 4 astronomers needed.

February 26 – Iolani School 4th Grade Space Night – 5 astronomers needed.

Chris Peterson reports that the permits for viewing locations at Kahala Community Park and Geiger Community Park are in the works. Barry Peckham and John Gallagher are hard at work obtaining the permits.

The star viewing at Dillingham Airfield has been enjoyable with fairly

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(Continued from page 2) *President's Report*

If found, Planet Nine would answer a perplexing question raised by the Kepler mission's discoveries of extrasolar planets. Planet Nine's purported size is in one of the most common size ranges among the planets Kepler has found. It was surprising that our solar system didn't have a planet like that. Perhaps it does, after all.

Chris Peterson

Hawaiian Astronomical Society
Event Calendar

February 2016

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
31	1 8:00 PM Globe at Night	2 8:00 PM Globe at Night 7:30 PM Club Meeting	3 8:00 PM Globe at Night	4 8:00 PM Globe at Night	5 8:00 PM Globe at Night	6 8:00 PM Globe at Night 6:10 PM Club Star Party (D)(Private)
7 8:00 PM Globe at Night sunset 18:05	8 8:00 PM Globe at Night	9 8:00 PM Globe at Night	10 8:00 PM Globe at Night	11 Kanoelani Elementary (Waipahu) 6:00 PM	12	13 6:15 PM Public Star Paty(G) 6:15 PM Public Star Paty(K)
14 sunset 18:10	15	16	17	18	19	20
21 sunset 18:14	22	23	24	25	26 7:30 PM Iolani Elementary School - 3rd Grade	27 6:20 PM Public Star Party (D)
28 sunset 18:19	29	1	2	3	4	5

☐☐Upcoming Star Parties☐☐

Public Party-Dillingham Feb. 27 (Peter Besenbruch)
Public Party Geiger Feb. 13
Public Party Kahala Feb. 13

Upcoming School Star Parties

Thur	Feb. 11, 2016	Kanoelani Elementary (Waipahu)
Fri.	Feb. 26, 2016	Iolani Elementary School - 3rd Grade

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cloud free skies. The December Public and Club Star Parties were well attended. Everyone shivered a bit, as the temperature dipped down to 61 degrees during the Club party. Some scopes experienced dew. Sue Girard was seen wearing her special viewing gloves.

December Meteor Shower – The Geminid meteor shower occurred on December 14, 2015. Ort Sapavith reported that their viewing went smoothly. The skies started off cloudy but cleared around 8:00 p.m. The count built slowly as the evening wore on with at total count of 112.

Parking Changes at Bishop Museum – Just a reminder that those H.A.S. members who are not members of the Bishop Museum will need to pay $5 for general parking during the day and $3 on meeting nights. Payment is to be made at the automated kiosk in front of the Museum Shop. Those H.A.S. members who are also members of the Bishop Museum will receive a placard/sticker to be displayed, and will not have to pay the nightly parking fee.

Observing Calendar- The 2016 calendar of meetings and the observing schedule for Dillingham Airfield, Geiger Community Park and Kahala Community Field has been finalized. The former December 31, 2016 listing has been deleted from the schedule, as it would probably not be well attended.

Star Light Reserve Committee –President Chris Peterson contacted Jim Crissafuli regarding the disposition of the Star Light Reserve Committee. He was informed that there were no "formal" meetings scheduled. However a bill will be introduced in the next legislative session to reestablish the S.R.C. Oahu has no county lighting ordinance and we would like to see that changed. Discussions continue at the state level regarding lighting on streets and highways. The use of LED lighting and the controversy over the color temperature continues.

Waiting to Hear – H.A.S. is waiting to hear from the following:

Stat Science and Engineering Fair –
I.F.A. Open House

Astronomy Day 2016 Day 2016 – This year International Astronomy Day will occur on May 14, 2016. We will be looking into utilizing the area directly in front of Ross' (formerly Barnes and Noble) at the Ewa end of Kahala Mall, upper level. We will endeavor to obtain permission from Kahala Mall Management and Ross' to use the parking area for daytime observations, as we have done in years past.

Events - Chris spoke to the membership regarding on-going events

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The Loneliest Galaxy In The Universe

By Dr. Ethan Siegel

NASA's Space Place

Our greatest, largest-scale surveys of the universe have given us an unprecedented view of cosmic structure extending for tens of billions of light years. With the combined effects of normal matter, dark matter, dark energy, neutrinos and radiation all affecting how matter clumps, collapses and separates over time, the great cosmic web we see is in tremendous agreement with our best theories: the Big Bang and General Relativity. Yet this understanding was only possible because of the pioneering work of Edwin Hubble, who identified a large number of galaxies outside of our own, correctly measured their distance (following the work of Vesto Slipher's work measuring their redshifts), and discovered the expanding universe.

But what if the Milky Way weren't located in one of the "strands" of the great cosmic web, where galaxies are plentiful and ubiquitous in many different directions? What if, instead, we were located in one of the great "voids" separating the vast majority of galaxies? It would've taken telescopes and imaging technology far more advanced than Hubble had at his disposal to even detect a single galaxy beyond our own, much less dozens, hundreds or millions, like we have today. While the nearest galaxies to us are only a few million light years distant, there are voids so large that a galaxy located at the center of one might not see another for a hundred times that distance.

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Image credit: ESA/Hubble & NASA and N. Gorin (STScI); Acknowledgement: Judy Schmidt, of the loneliest void galaxy in the known: MCG+01-02-015.

Meteor Log—February 2016

by Tom Giguere

February is a fairly dry month for meteors. The International Meteor Organization (IMO) lists a single shower for February, the α-Centaurids, which are

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First Quarter	Full Moon	Last Quarter	New Moon
February 15	February 22	February 1	February 8

Shower	Activity	Maximum		Radiant		V_∞	*r*	ZHR
		Date	$\lambda_\odot$	α	δ	km/s		
Feb Eta Draconids (FED)	02/03→ 02/06	Feb 04	315.0°		+61.0°	32.0		< 2
Feb Epsilon Virginids (FEV)	02/04→ 02/15	Feb 04	315.0°		+11.0°	64.0		< 2
Pi Hydrids (PIH)	02/04→ 02/15	Feb 07	318.0°		-21.0°	55.3		< 2
Omega Centaurids (OCA)	02/12→ 02/16	Feb 14	325.0°		-55.0°	48.0		< 2
Theta Centaurids (TCN)	02/12→ 02/16	Feb 14	325.0°		-29.0°	65.0		< 2
Beta Herculids (BHE)	02/13→ 02/16	Feb 14	325.0°		+25.0°	53.0		< 2
Feb Mu Virginids (FMV)	02/16→ 03/04	Feb 26	337.0°		-02.0°	62.0		< 2

If you get lucky and see one of these elusive meteors, tell your friends (and Mike and I)! 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 December 16 –Januaey 15 2016			
Beginning Balance			1663.64
Income:			
	Dues Received	322.00	
	Astronomy Magazine	34.00	
	T-shirt sales	15.00	
	Donations	60.00	
	Calendars	13.00	
Total Income			506.00
Expenses:			
	December Astronews printing & mailing	126.84	
	January Astronews printing & mailing	119.74	
	Astronomy Magazine	34.00	
Total Expenses			280.58
Ending Balance			1889.06

We welcome seven new members this month. They are **Christie Benker, Jameeka Marshall,** and **Nevyn, Warren, Lena, Kawai & Chris Tyau**.

Many thanks to those renewing their membership (Greg Barina, Gary Bloom. Joanne Bogan, Adelaide Brenner, Gary Chock. Walter Muraski. Chris Peterson, Brian Hill & Johannette Rowley, G. Schmidt, Eugene Shimabukuro, Walter Tokushige, Stephen Ugelow, Gary and Eileen Ward, Mark Watanabe, Jay Wrathall).

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

(Continued from page 8) *Meteor Log*

too far south for North Americans to observe (-59 degrees). This month we feature the weak meteor showers listed by the American Meteor Society (AMS). In place of one shower, the AMS features seven showers! Of course, all of them are quite weak, or nearly non-existent, with less than two meteors per hour…. and that's the peak in ideal conditions.

(Space Place Continued from page 7)

While we've readily learned about our place in the universe from observing what's around us, not everyone is as fortunate. In particular, the galaxy MCG+01-02-015 has not a single known galaxy around it for a hundred million light years in all directions. Were you to draw a sphere around the Milky Way with a radius of 100 million light years, we'd find hundreds of thousands of galaxies. But not MCG+01-02-015; it's the loneliest galaxy ever discovered. Our Milky Way, like most galaxies, has been built up by mergers and accretions of many other galaxies over billions of years, having acquired stars and gas from a slew of our former neighbors. But an isolated galaxy like this one has only the matter it was born with to call its own.

Edwin Hubble made his universe-changing discovery using telescope technology from 1917, yet he would have found absolutely zero other galaxies at all were we situated at MCG+01-02-015's location. The first visible galaxy wouldn't have shown up until we had 1960s-level technology, and who knows if we'd have continued looking? If we were such a lonely galaxy, would we have given up the search, and concluded that our galaxy encompassed all of existence? Or would we have continued peering deeper into the void, eventually discovering our unusual location in a vast, expanding universe? For the inhabitants of the loneliest galaxy, we can only hope that they didn't give up the search, and discovered the entire universe.

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and missions.

Space X – The Space X was successful in landing their module at the Kennedy Space Center. They hope to make landings more practical to cut down on turn around time and the expense of launch and landings.

Insight Mission – This mission to Mars established a seismometer. The seismometer seems to be inaccurate due to a problem with its vacuum seal. They will also need to create as bore hole to measure the rate of heat fluctuation.

Messenger mission - NASA.gov updates lists this mission as over.

Mars Exploration Rovers – NASA.gov –Opportunity rover appears to have reached the sand dunes.

Cassini Mission – NASA.gov -Saturn and solstice missions, and Cyclops - has a few years of work to go before the mission is over. The end of the mission should be quite exciting, with the orbiter moving through the ring systems.

New Horizons- NASA.gov – The primary mission has been completed, with data trickling back to NASA from space. The secondary mission will be to go to investigate targeted Kuiper Belt objects. A proposal for this is in the works.

Juno - NASA.gov

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Peter Besenbruck provided a power point compilation. New member Don Andero's pictures of the Orion nebula, from the last Dillingham Airfield outing were very nice. He demonstrated that with a smart hook-up you could take some very effective pictures with an SLR camera. Don's were taken through this 6" Celestron.

Peter continued with pictures from the Mars Curiosity rover, which has reached the Namib Dunes in December 0f 2015. Peter also shared that the Dawn mission is moving to take spectacular pictures of Ceres. Former

Peter closed his presentation with two more morsels. Recent work has revealed that scientists have discovered the nearest habitable planet outside our solar system as Wolf 1061C.

Lastly Space X keeps on working on advancing multiple use space vehicles. They had one spectacular failure with a June 2015 landing, but on December 21, 2015 they experienced a successful landing.

The Planetarium – Joanne presented a mesmerizing "Magical Mystery Tour" laser show to delight everyone in the planetarium. She took us into the night sky to point out the conjunction of the string of planets available in the early, early morning skies, between January 20th and February 20th.

Mahalo – As there was no further business, the meeting was adjourned at 8:59 p.m. Merry Christmas and a Happy New Year!

Respectfully Submitted

Gretchen West

H.A.S. Secretary

All in all, the Geminids put on an excellent show this year. Put this shower on your list to observe next December.

H.A.S.
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This composite image shows the size and location of the Smith Cloud on the sky. The cloud appears in false-color, radio wavelengths as observed by the Green Bank Telescope in West Virginia. The visible-light image of the background star field shows the cloud's location in the