The Astronews

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December 2015

Super Massive Black Hole Swallows a Star

Instead of Cookie Monster, astronomers have caught a ravenous (ravens are black, after all) black hole in the act of making a brief lunch of a star. Pictures and more information can be found at http://www.astronomy.com/news/2015/11/supermassive-black-hole-spotted-snacking-on-a-star . The jet plasma might be a black hole's version of a burp. This was just a thought that Thanksgiving dinner may be a more widespread phenomena than previously thought. Some scientists are even thinking a black hole could be conscious and be on the lookout for particularly tasty stars. Early bird special on April 1.

Double President's report

Due to an inadequate proof-reading of the prior months issue where I truncated the President's Report, there will be a full printing of both the December and November President's Reports. Sincere apologies to all.
C. Rykken

Inside this issue:

Upcoming Events:

The next meeting is on Tuesday, Dec. 1st 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., Nov. 29 at 3:30 PM in POST building at UH.

President's Message December 2015 and November 2015

December

How are humans different from other creatures on this planet? What gives us the ability to continually change the way we live and the things we do? One reason is our extensive development of culture. That is facilitated by our use of language.

Humans don't have to learn everything from scratch. Incremental changes are learned and passed on to others who can then build on what has been done before. Our culture is the sum of what has been developed and kept by those who have gone before.

What does this have to do with astronomy? Astronomy is part of our culture. We make progress in our understanding of the universe at what seems to be an ever-increasing pace. Each advance enables those who follow to go beyond it.

Progress is not the only component of culture, though. Organizations like HAS help perpetuate and expand interest in astronomy. Everyone reading this or attending our meetings or participating in star parties or discussing astronomy with friends is part of the cultural fabric of astronomy. You may feel that your role in astronomy is insignificant, but it's not.

What would happen to the performing arts if no audiences showed up? It is the collective actions of many people that enable cultural activities to continue. Your participation in HAS allows the club to continue. This provides a venue for others to become aware that astronomy-related activities exist here and to explore their own interest in astronomy.

Some, of course, contribute more to the perpetuation of astronomy culture than

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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.

Planets Close To the Moon
Times are Hawaii Standard Time

Dec 3, 18h, M 1.9° SW of Jupiter (80° from sun in morning sky)
Dec 5, 17h, M 0.13° WSW of Mars (60° from sun in morning sky)
Dec 7, 07h, M 1.1° ENE of Venus (42° from Sun in morning sky)
Dec 16, 19h, M 2.7° NW of Neptune (71° from sun in evening sky)
Dec 19, 15h, M 1.1° SSE of Uranus (109° from sun in evening sky)
Dec 31, 09h, M 1.9° SSE of Jupiter (106° from sun in morning sky)

Mercury and Saturn are closer than 15° from the sun when near the moon in December.

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Other Events of Interest
Times are Hawaii Standard Time

Dec 3, 05h 15 Eunomia at perihelion. (2.1484 au from sun)

Dec 11, 00:29h, New Moon
Dec 14, Geminid Meteors
Dec 21, 18:48h, Winter Solstice
Dec 25, 01:11h, Full Moon

Dec 28, 17h, Mercury at greatest elongation (19.7° East of the sun in evening sky)

Planets in December

Mercury
may be viewed in the evening twilight late in the month.

Venus
shines brightly in the morning sky, at about magnitude -4.1.

Mars
above Venus in the morning sky, but much dimmer.

Jupiter
rises before midnight by the end of December and is visible in the morning sky.

Saturn
is lost in the glare of the sun in December.

Uranus
is near the meridian after sunset a can be viewed in the evening hours.

Neptune
is visible in the southwest after sunset.

15-Eunomia (Asteroid)
reaches perihelion early in December and is still visible at about magnitude +9. This is one of the brightest asteroids after the first four.

Pluto (Dwarf Planet)
is too close to the sun to be viewed easily in December

Meeting Minutes

H.A.S. Secretary

Due to severe technical difficulties there will be no minutes this issue

Gretchen West

H.A.S. Secretary

(Continued from page 2) President's Report

others. Professional astronomers devote whole lifetimes to advancing astronomical knowledge while many people simply pay attention to widely publicized events, such as eclipses, but all the contributions matter. If you'd like to step up your level of contribution, please consider serving as an HAS board member. Elections will be held at the December meeting.

November 2015

In the history of astronomy as well as for most amateur astronomers of any time, the Moon has been one of the first objects of interest, and one that is frequently revisited. Its relative proximity provides more detailed views than does any other celestial target, and its constantly changing phase means we almost never observe it under exactly the same conditions. It's even possible to watch the Sun rise or set on parts of the Moon during a single observing session.

The Moon isn't only an object to observe, though. It can also be a platform from which astronomical observation of other objects can be undertaken. Earth's Moon has several attributes that make it a desirable location for astronomy.

The lack of atmosphere makes it possible to observe in any part of the sky, all the way down to the horizon, with no distortion. Daytime observation is even quite feasible with a little extra shielding to block light reflected from surface features. The slow lunar rotation would allow for very long integration times when imaging faint objects. Cold temperatures would make it easier to avoid thermal noise during infrared observation. Lower gravity would allow for the construction of larger structures than on Earth.

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DECEMBER

SUNDAY

2015/December

FIRST DAY OF WEEK

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29	30	01 7:30 PM Club Meeting	02 8:00 PM Globe at Night	03 8:00 PM Globe at Night	04 8:00 PM Globe at Night	05 8:00 PM Globe at Night 5:45 PM Club Star Party (D) (Private)
06 8:00 PM Globe at Night sunset 17:49	07 8:00 PM Globe at Night	08 8:00 PM Globe at Night	09 8:00 PM Globe at Night	10 8:00 PM Globe at Night	11 8:00 PM Globe at Night	12 5:30 PM Public Star Party (D)
13 sunset 17:51	14	15	16	17	18	19 5:45 PM Public Star Party (G) 5:45 PM Public Star Party (K)
20 sunset 17:54	21	22	23	24	25	26
27 sunset 17:58	28	29	30	31	01	02
03	04	05	06	07	08	09

☐☐Upcoming Star Parties☐☐

Public Party-Dillingham Dec. 12 (Chris Peterson)
Public Party Geiger Dec. 19
Public Party Kahala Dec. 19

Upcoming School Star Parties

		No School Star Parties for December

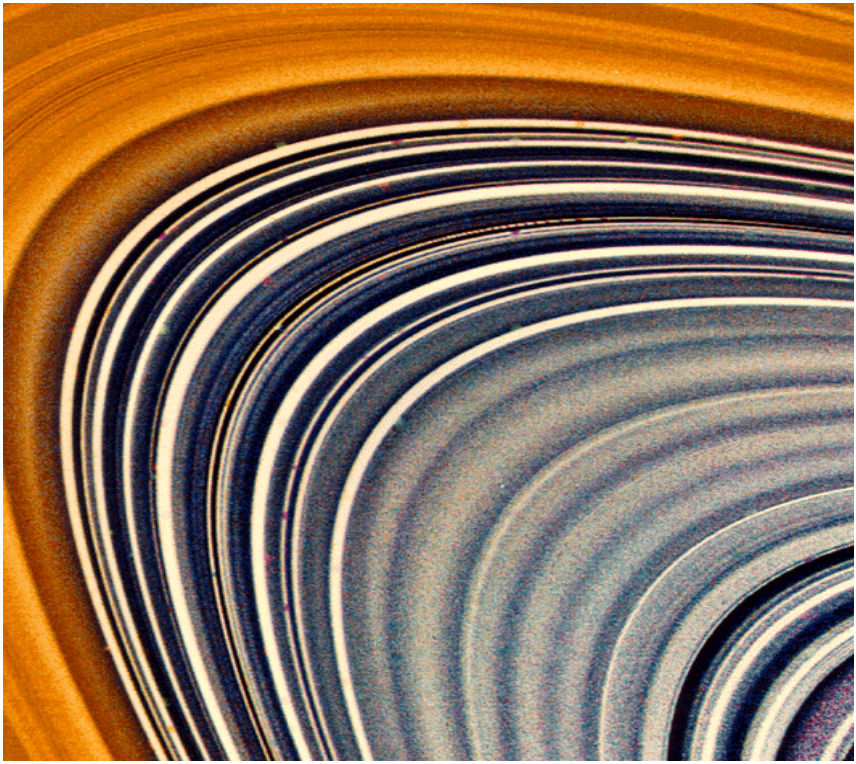
(Continued from page 4) President's Report

The far side of the Moon is the only place in our solar system that is constantly shielded from radio waves generated on Earth. Radio astronomy on the far side could take advantage of the bowl shape of craters up to 10 kilometers or so President's Reportin diameter to build very large Arecibo-style radio telescopes.

According to the BBC, Russia and Europe are collaborating on a series of robotic missions to the Moon that will commence with Luna 27 in 2020. This will explore the South Pole-Aitkin basin on the lunar far side. The hope is to follow these with human landings and a lunar base.

I am hopeful that all spacefaring nations can join a cooperative effort to establish a human presence on the Moon. This would reduce costs for each country and avoid a lot of political friction if all of the players are involved and in agreement about what activities are appropriate. Astronomy should play a prominent role in such endeavors.

Chris Peterson



The rings of Saturn are a never ending source of delight.
From : http://www.freeimages.co.uk/galleries/space/planets/

Our Solar System Is Almost Normal, But Not Quite

By Dr. Ethan Siegel

.It was just over 20 years ago that the very first exoplanet was found and confirmed to be orbiting a star not so different from our own sun. Fast forward to the present day, and the stellar wobble method, wherein the gravitational tug of a planet perturbs a star's motion, has been surpassed in success by the transit method, wherein a planet transits across the disk of its parent star, blocking a portion of its light in a periodic fashion. Thanks to these methods and NASA's Kepler spacecraft, we've identified many thousands of candidate planets, with nearly 2,000 of them having been confirmed, and their masses and densities measured.

The gas giants found in our solar system actually turn out to be remarkably typical: Jupiter-mass planets are very common, with less-massive and more-massive giants both extremely common. Saturn—the least dense world in our solar system—is actually of a fairly typical density for a gas giant world. It turns out that there are many planets out there with Saturn's density or less. The rocky worlds are a little harder to quantify, because our methods and missions are much better at finding higher-mass planets than low-mass ones. Nevertheless, the lowest mass planets found are comparable to Earth and Venus, and range from just as dense to slightly less dense. We also find that we fall right into the middle of the "bell curve" for how old planetary systems are: we're definitely typical in that regard.

But there are a few big surprises, which is to say there are three major ways our solar system is an outlier among the planets we've observed:

All our solar system's planets are significantly farther out than the average distance for exoplanets around their stars. More than half of the planets we've discovered are closer to their star than Mercury is to ours, which might be a selection effect (closer planets are easier to find), but it might indicate a way our star is unusual: being devoid of very close-in planets.

All eight of our solar system's planets' orbits are highly circular, with even the eccentric Mars and Mercury only having a few percent deviation from a perfect circle. But most exoplanets have significant eccentricities, which could indicate something unusual about us.

And finally, one of the most common classes of exoplanet—a super-Earth or mini-Neptune, with 1.5-to-10 times the mass of

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Meteor Log—December 2015

by Tom Giguere

Geminids - one of the finest, and probably the most reliable, of the major annual showers presently observable. Well north of the equator, the radiant rises about sunset, reaching a usable elevation from the local evening hours onwards. Even from more southerly sites, this is an excellent stream of often bright, medium-speed meteors, a rewarding event for all observers, whatever method they employ. The peak has shown slight signs of variability in its

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First Quarter	Full Moon	Last Quarter	New Moon
December 18	December 25	December 3	December 11

Shower	Activity	Maximum		Radiant		V_∞	*r*	ZHR
		Date	$\lambda_\odot$	α	δ	km/s		
Phoenicids (PHO)	11/28→12/09	Dec 06	254.25°	18°	-53°	18	2.8	Var
Puppid/Velids (PUP)	12/01→12/15	(Dec 07)	(255°)	123°	-45°	40	2.9	10
Monocerotids (MON)	11/27→12/17	Dec 09	257°	100°	+08°	42	3.0	2
σ-Hydrids (HYD)	12/03→12/15	Dec 12)	260°	127°	+02°	58	3.0	3
Geminids (GEM)	12/04→12/17	Dec 14	262.2°	112°	+33°	35	2.6	120
omae Berenicids (COM)	12/12→12/23	Dec 16	264°	175°	+18°	65	3.0	3
Dec. Leonis Minorids (DLM)	12/05→02/04	Dec 19	268°	161°	+30°	64	3.0	5
Ursids (URS)	12/17→12/26	Dec 22	270.7°	217°	+76°	33	3.0	10

The Geminids could be good this year, check it out! For more info: Thomas 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 October 16 – November 15 2015			
Beginning Balance			1811.68
Income:			
	Dues Received	60.00	
	Calendar orders	111.00	
	Astronomy Magazine	34.00	
	Sky & Telescope subscription	32.95	
Total Income			237.95
Expenses:			
	November Astronews printing & mailing	173.30	
	Laptop	228.99	
	Stamps	9.80	
	Calendars	130.00	
Total Expenses			542.09
Ending Balance			1507.54

. We welcome one new members this month. He is ***Hugo Higa.***

. Many thanks to those renewing their membership (Gretchen West and Dyron Mack). 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*

rates and timing in recent years, with the more reliably-reported maxima during the past two decades, all having occurred within λ = 261 ◦ 5 to 262 ◦ 4, 2015 December 14, 01h 30m –23h UT. Converting this Universal time to Hawaiian time, the peak will span from Sunday 12/13, 3:30pm to Monday 12/14, 1pm. . . Near-peak Geminid rates usually persist for almost a day though, so much of the world has the chance to enjoy something of the shower's best, regardless of when the maximum actually happens. Mass-sorting within the stream means fainter telescopic meteors should be most abundant almost a day ahead of the visual maximum, with telescopic results indicating such meteors radiate from an elongated region, perhaps with three sub-centers. The radiant for the Geminids is shown in the attached figure.

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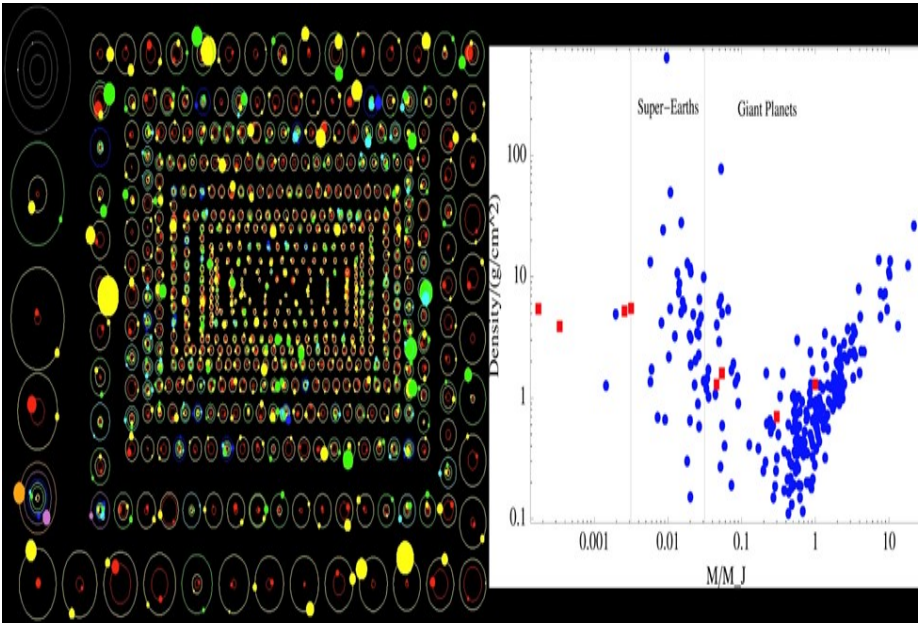
(Space Place Continued from page 7)

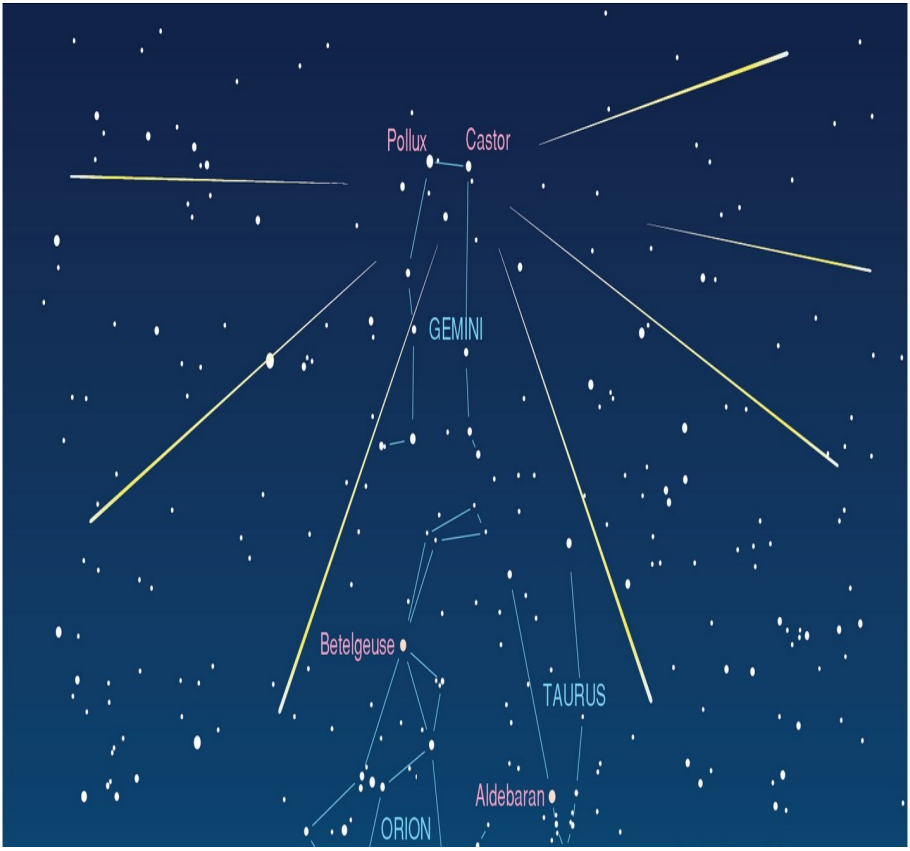
Earth—is completely missing from our solar system.

Until we develop the technology to probe for lower-mass planets at even greater distances around other star systems, we won't truly know for certain how unusual we really are!



Images credit: NASA / Kepler Dan Fabricky (L), of a selection of the known Kepler exoplanets; Rebecca G. Martin and Mario Livio (2015) ApJ 810, 105 (R), of 287 confirmed exoplanets relative to our eight solar system planets.

(Continued from page 9) Meteor Log
The 2015 peak arrives just three days after new Moon, so observing conditions are ideal.



The Geminid Radiant. Image Credit & Copyright: stardate.org

H.A.S.
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Hubble's 25th anniversary image features a giant, sparkling cluster of about 3,000 stars called Westerlund 2. **Cred it:** NASA, ESA, the Hubble Heritage Team (STScI/AURA), A. Nota (ESA/STScI), and the Westerlund 2 Science Team