

Volume 59, Volume 1

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www.hawastsoc.org

President's Message

by Chris Peterson

Some first-time events happen at a readily identifiable moment:

October 4, 1957, Sputnik becomes the first artificial satellite of Earth;

April 12, 1961, Yuri Gagarin becomes the first human in space;

July 20, 1969, Apollo 11 lands the first humans on another world.

Other firsts happen gradually, and we can't pin them down to a point in time. The Voyager 1 spacecraft is accomplishing such a first right now.

The Voyager 1 and 2 spacecraft revolutionized our understanding of our solar system's giant planets. Both flew past Jupiter and Saturn, improving on the job done by the Pioneer missions and providing spectacular images of the planets and their moons. Voyager 2 also gave us our only close-up images to date of the Uranus and Neptune systems.

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☆ Upcoming Star Par	ties ☆
Club Party-Dillingham	Jan. 4
Kahala/ <u>Waikele Party</u> **	Jan. 15
Public Party-Dillingham	Jan. 8

**please see page 10 for information regarding Waikele Public Star Parties

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Upcoming Events:

☆The next meeting is 7:30PM on Tues., Jan. 4 at the Bishop Museum Planetarium.

Bishop Museum's next planetarium shows with Barry Peckham are Friday, Jan. 7 & 21at 8:00 p.m.

www.bishopmuseum.org/ calendar

☆The next Board Meeting is Sun., Jan. 2 at 3:30 p.m. at the POST building at UH.





MAUNA KEA ASTRONOMY TOUR UPDATE:

June 24-26, 2011

Join your fellow clubmembers for a private tour to the Gemini telescope facility on Mauna Kea next summer! Other activities may include a star party at the Onizuka visitor information center, lunch or dinner at Hale Pohaku with astronomers, and a visit to the Imiloa Astronomy Center/Planetarium in Hilo.

The tour is limited to 22 persons. Participants *must* be 16 years of age or older at the time of the tour, and be current members of HAS. Participants must also be physically capable of visiting the Mauna Kea summit at nearly 14,000 feet. Tour reservation requests will be accepted by *email only* through March 31, 2001. If the number of applicant requests exceeds 22, then a random selection process will occur.

Participants will share transportation costs to the summit (van rental/gas), the two meals on Mauna Kea, and admission/ show fees for the Imiloa Astronomy Center (approx. total \$100/person). These fees will be non-refundable (except in the case of HAS tour cancellation). Participants will also be responsible for making their own lodging and travel arrangements to/ from Hilo. We plan to use the Castle Hilo Hawaiian Hotel as our gathering place and have secured a group rate discount for rooms.

Submit reservation requests or inquiries to:

John Sandor sandball@aol.com

Updates will be made in the AstroNews, on the HAS website, and at the monthly meetings. We look forward to seeing you next summer on the Big Island!



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The **ASTENDELLS** is a 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 email. The deadline is the 16th of each month. We are not responsible for unsolicited artwork.

Meeting Minutes

by Gretchen West

Vice President Barry Peckham called the December 7, 2010 meeting of the Hawaiian Astronomical Society to order at 7:47 p.m. The meeting was held at the Planetarium on the grounds of the Bishop Museum. There were nineteen members in attendance.

Total Lunar Eclipse - Barry Peckham reports that Bishop Museum Education Director Mike Shannahan has announce that the museum will have a public event on the Great Lawn on Monday evening December 20th, to view the total lunar eclipse that will be visible in Hawaii that evening. Mike is asking H.A.S. for its help in showing the public the night sky that evening. Set up will take place by 6:30 p.m. Five H.A.S. astronomers have volunteered to help. The public was asked to call for reservations to the museum event.

Elections - The yearly election of board members took place at the December general membership meeting. Harry Zisko was this year's elections chairman. Open formal nominations were called at the December general membership meeting. The slate contained:

President	- Chris Peterson
Vice-President	- Barry Peckham
Treasurer	- Jim MacDonald
Secretary	- Gretchen West
ASTRONEWS editor	- Carolyn Kaichi
At-Large Members	- John Ğallagher & Paul Lawler

Jay Wrathall moved to accept the slate by acclamation, with a second by John Sandor. The slate was accepted by a unanimous show of hands.

Announcements : Starlight Reserve Bill – Harry Zisko reported of the meetings of the committee charged with writing recommendations for a Hawaii State House and Senate bill on light pollution and actions which can be taken to reduce it. The committee is in that part of their deliberations during which they are identifying the stakeholders. They will submit a report to legislators on their findings. The next meeting will be January 18th. The bill when it is finally drafted will affect all of our state.

Imaginarium Visit – Our visit at Windward Community College's Imaginarium will may take place in January 2011. There will be postings on our website and an update will be circulated by member Gary Ward in his "pizzagram."

Big Island Trip – The Hawaiian Astronomical Society has received an invitation for club members to tour the Gemini Observatory on the Big Island. The tentative date for the visit has been set for the weekend of June 24,25, and 26. see page 5 for more information.

Harry Zisko suggested that having an additional 4WD car would be advantageous. During the last visit, one of our group needed to be taken down the mountain, to the hospital. If we were to have only the two large vans, should something happen like that again, the whole van load of people would need to return down the mountain with the ill party.

Should there be more than 22 people wanting to go on the trip, it was decided that a lottery would be held to see who would go. There will be payment deadlines for payments and refunds for those who get a reserved placement for the trip. If interested, contact Joanne Bogan.

<u>Sky Tools III</u> – Ten copies of the Sky Tools III computer software have been ordered. Nine copies were prepaid and the one remaining copy was purchased at the meeting.

Change of Venue – H.A.S. Saturday suburban public star parties in West O`ahu have been located at the baseball field at Waikele Community Park, above the Waikele Shopping Center. However as of February 12, 2011, the location for the West O'ahu H.A.S. public star party will change to Geiger Community Park, located at the intersection of Geiger Road and Kapolei Parkway.

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Astronomers Stumble onto Huge Space Molecules

By Trudy E. Bell and Dr. Tony Phillips

Deep in interstellar space, in a the swirling gaseous envelope of a planetary nebula, hosts of carbon atoms have joined together to form large three-dimensional molecules of a special type previously seen only on Earth. Astronomers discovered them almost accidentally using NASA's Spitzer Space Telescope.

"They are the largest molecules known in space," declared Jan Cami of the University of Western Ontario, lead author of a paper with three colleagues published in Science online on July 22, 2010, and in print on September 3.

Not only are the molecules big: they are of a special class of carbon molecules known as "fullerenes" because their structure resembles the geodesic domes popularized by architect Buckminster Fuller. Spitzer found evidence of two types of fullerenes. The smaller type, nicknamed the "buckyball," is chemical formula C60, made of 60 carbon atoms joined in a series of hexagons and pentagons to form a spherical closed cage exactly like a black-and-white soccer ball. Spitzer also found a larger fullerene, chemical formula C70, consisting of 70 carbon atoms in an elongated

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The infrared spectroscopic signature of "Buckyballs," 60-carbon-atom molecules, have been identified in a planetary nebula.

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The Astronews

A pair of NASA spacecraft that were supposed to be dead a year ago are instead flying to the Moon for a breakthrough mission in lunar orbit.

"Their real names are THEMIS P1 and P2, but I call them 'dead spacecraft walking," says Vassilis Angelopoulos of UCLA, principal investigator of the THEMIS mission. "Not so long ago, we thought they were goners. Now they are beginning a whole new adventure."

The story begins in 2007 when NASA launched a fleet of five spacecraft into Earth's magnetosphere to study the physics of geomagnetic storms. Collectively, they were called THEMIS, short for "Time History of Events and Macroscale Interactions during Substorms." P1 and P2 were the outermost members of the quintet.

Working together, the probes quickly discovered a cornucopia of previously unknown phenomena such as colliding auroras, magnetic spacequakes, and plasma bullets shooting up and down Earth's magnetic tail. These findings allowed researchers to solve several longstanding mysteries of the Northern Lights.

The mission was going splendidly, except for one thing: Occasionally, P1 and P2 would pass through the shadow of Earth. The solar powered spacecraft were designed to go without sunlight for as much as three hours at a time, so a small amount of shadowing was no problem. But as the mission wore on, their orbits evolved and by 2009 the pair was spending as much as 8 hours a day in the dark.

"The two spacecraft were running out of power and freezing to death," says Angelopoulos. "We had to do something to save them."

The team brainstormed a solution. Because the mission had gone so well, the spacecraft still had an ample supply of fuel--enough to go to the Moon. "We could do some great science from lunar orbit," he says. NASA approved the trip and in late 2009, P1 and P2 headed away from the shadows of Earth.

With a new destination, the mission needed a new name. The team selected ARTEMIS, the Greek goddess of the Moon. It also stands for "Acceleration, Reconnection, Turbulence and Electrodynamics of the Moon's Interaction with the Sun."

The first big events of the ARTEMIS mission are underway now. On August 25, 2010, ARTEMIS-P1 reached the L2 Lagrange point on the far side of the Moon. Following close behind, ARTEMIS-P2 entered the opposite L1 Lagrange point on Oct. 22nd. Lagrange points are places where the gravity of Earth and Moon balance, creating a sort of gravitational parking spot for spacecraft.

"We're exploring the Earth-Moon Lagrange points for the first time," says Manfred Bester, Mission Operations Manager from the University of California at Berkeley, where the mission is operated. "No other spacecraft have orbited there."

Because they lie just outside Earth's magnetosphere, Lagrange points are excellent places to study the solar wind. Sensors onboard the ARTEMIS probes will have in situ access to solar wind streams and storm clouds as they approach our planet—a possible boon to space weather forecasters. Moreover, working from opposite Lagrange points, the two spacecraft will be able to measure solar wind turbulence on scales never sampled by previous missions.

"ARTEMIS is going to give us a fundamental new understanding of the solar wind," predicts David Sibeck, ARTEMIS project scientist at the Goddard Space Flight Center. "And that's just for starters."

ARTEMIS will also explore the Moon's plasma wake—a turbulent cavity carved out of the solar wind by the Moon itself, akin to the wake just behind a speedboat. Sibeck says "this is a giant natural laboratory filled with a whole zoo of plasma waves waiting to be discovered and studied."

These far-out explorations may have down-to-Earth applications. Fundamental discoveries by ARTEMIS could help advance research in the area of clean renewable energy.

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Observer's Notebook

Planets Close To the Moon Times are Hawaii Standard Time

Jan 2, 06h, M 3.9° SSE of **Mercury** (21° from sun in morning sky)

Jan 7, 11h, M 4.8° NNW of **Neptune** (40° from sun in evening sky)

Jan 9, 23h, M 6.0° NNW of **Uranus** (67° from sun in evening sky)

Jan 10, 01h, M 6.5° NNW of **Jupiter** (68° from sun in evening sky)

Jan 24, 18h, M 7.6° SSW of Saturn (108° from sun in morning sky)

Jan 29, 17h, M 3.5° S of Venus (46° from sun in morning sky)

Mars is closer than 15° from the sun when near the moon in January.

by Jay Wrathall

Other Events of Interest Times are Hawaii Standard Time

Jan 3,09h, Earth at perihelion - nearest the sun (0.98333 a.u. or 147,100,000 km)

Jan 3, 23:03h, Moon New

Jan 4, Quadrantid meteors (Favorable year for this major shower)

Jan 4, 05h, Jupiter 0.52° SSE of **Uranus** (73° from sun in evening sky)

Jan 6, 02h, Moon 0.71° SSE of asteroid 15 Eunomia (25° from sun in evening sky)

Jan 8, 06h, Venus at greatest elongation (47° west of the sun in morning sky)

Jan 9, 04h, Mercury at greatest elongation (23.3° west of the sun in morning sky)

Jan 19, 11:22h, Moon Full

ØMercury	Q Venus	O [*] Mars		
Has a fine morning apparition early in the month, reaching greatest elongation on Jan 9, a day after Venus is at greatest elongation.	Bright and high in the eastern sky before dawn during all of January. Reaches greatest elonga- tion on Jan 8.	Too close to the sun to be observed in January.		
외 Jupiter	 わ Saturn	O Uranus		
Jupiter is well placed for viewing in the southwest at sunset. It is very close to Uranus on Jan 4.	Rises a little before mid- night and is well placed for morning viewing before dawn.	Close to Jupiter in the evening sky.		
Ψ́ Neptune	P Dwarf Planet Pluto	Asteroid Iris		
Can be viewed west of Jupiter in the evening sky	Visible before dawn in the eastern sky, but will be better placed for observing later in the year.	Will reach opposition on Jan 24 at about magnitude +7.9. It can be observed late in the evening in Cancer.		
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<u>Video Difficulties</u> – Due to unforeseen difficulties, the video, "Cosmic Collisions" was not seen at the meeting.

<u>Night Sky Network</u> – **John Gallagher** gave us an update of the most current teleconference hosted by NASA. He handed out copies of sky maps for January 2011 and related some information about the material in the asteroid belt.

<u>Discussions with Barry</u> – Vice President **Barry Peckham** spoke briefly on the advances we have seen in amateur astronomy since 1981. Barry spoke about the unusually good skies we have had during the last month or so. He also encouraged those members who do not have scopes to come to star parties and become more involved. Participation in sidewalk astronomy and outreach to the community is a great way to give back to the community.

This month's information on the night sky centered on Aldeberon, the constellation of Taurus and general information related to this very visible winter star.

To the delight of all, Planetarium guide and longtime member, **Joanne Bogan**, lead us through the current nighttime skies over Hawaii, showing us the movement of constellations along the ecliptic and other interesting objects.

As there was no further business, the meeting was adjourned at 9:09 p.m. Light refreshments were served.

Respectfully Submitted, Gretchen West H.A.S. Secretary



Night Sky Network

Astronomy Clubs bringing the wonders of the universe to the public

COSMIC COLLISIONS (REVISITED)

DUE TO TECHNICAL PROBLEMS, THE VIDEO THAT WAS TO BE SHOWN AT LAST MONTH'S MEETING DID NOT PLAY. NEW SOFTWARE INSTALLED SHOULD CORRECT THE ISSUE AND IT WILL NOW BE SHOWN AT JANUARY'S MEETING

The club has received a DVD from the Night Sky Network called "Cosmic Collisions", produced by American Museum of Natural History. This 20-minute video will be shown at the December meeting. It shows the importance of cosmic collisions starting from when the Universe was first formed, the time of the dinosaurs, today, to what they expect will happen in the furture.

Clear Nights, John G.

(Dead Spacecraft continued from page 2)

After six months at the Lagrange points, ARTEMIS will move in closer to the Moon—at first only 100 km from the surface and eventually even less than that. From point-blank range, the spacecraft will look to see what the solar wind does to a rocky world when there's no magnetic field to protect it.

"Earth is protected from solar wind by the planetary magnetic field," explains Angelopolous. "The Moon, on the other hand, is utterly exposed. It has no global magnetism."

Studying how the solar wind electrifies, alters and erodes the Moon's surface could reveal valuable information for future explorers and give planetary scientists a hint of what's happening on other unmagnetized worlds around the solar system. The Dead Spacecraft Walking may have a long life, after all.

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Hawaiian Astronomical Society Event Calendar

< January 2011 >						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
26	27	28	29	30	31	New Year's Day 1 Sunset: 6:02 PM
2	3	7:30 PM Club 4 Meeting	5	6	7	5:30 PM Public 8 Star Party(D) 8 Sunset: 6:06 PM
9	10	11	12	13	14	5:45 PM Public 15 Star Party(K) 5:45 PM Public Star Party(W) Sunset: 6:11 PM
16	Martin Luther 17 King, Jr. Day	18	19	20	21	22 Sunset: 6:16 PM
23	24	25	26	27	28	6:00 PM Club 29 Star Party (D) 29 Sunset: 6:21 PM
30	31	1	2	3	4	5

Upcoming School Star Parties



HAVE A NICE VACATION!

If you are interested in helping out at a School Star Party, sign up at the HAS meeting or contact the Star Party Coordinator: **John Gallagher** at 683-0118 (leave message) or e-mail at gallaghej002@hawaii.rr.com. If you are contacted for a School Star Party please have the school submit a request at http://nightsky.jpl.nasa.gov/club-eventrequest.cfm?Club_ID=453 (note underline between Club_ID).

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The Astronews

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closed cage more resembling an oval rugby ball.

Neither type of fullerene is rigid; instead, their carbon atoms vibrate in and out, rather like the surface of a large soap bubble changes shape as it floats through the air. "Those vibrations correspond to wavelengths of infrared light emitted or absorbed— and that infrared emission is what Spitzer recorded," Cami explained.

Although fullerenes have been sought in space for the last 25 years, ever since they were first identified in the laboratory, the astronomers practically stumbled into the discovery. Co-author Jeronimo Bernard-Salas of Cornell University, an expert in gas and dust in planetary nebulae, was doing routine research with Spitzer's infrared observations of planetary nebulae with its spectroscopy instrument. When he studied the spectrum (infrared signature) of a dim planetary nebula called Tc 1 in the southern-hemisphere constellation of Ara, he noticed several clear peaks he had not seen before in the spectra of other planetary nebulae.

"When he came to me," recounted Cami, an astrophysicist who specializes in molecular chemistry, "I immediately and intuitively knew it I was looking at buckyballs in space. I've never been that excited!" The authors confirmed his hunch by carefully comparing the Tc 1 spectrum to laboratory experiments described in the literature. "This discovery shows that it is possible—even easy—for complex carbonaceous molecules to form spontaneously in space," Cami said. "Now that we know fullerenes are out there, we can figure out their roles in the physics and chemistry of deep space. Who knows what other complex chemical compounds exist—maybe even some relevant to the formation of life in the universe!"

Stay tuned!

Learn more about this discovery at http://www.spitzer.caltech.edu. For kids, there are lots of beautiful Spitzer images to match up in the Spitzer Concentration game at http://spaceplace.nasa.gov/en/kids/spitzer/concentration.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Meteor Log

Monday January 3, 2011 - Quadrantids (QUA)

This is a good year for this shower because it falls on the night of the New Moon, however this is a "short" shower, with the best chance of seeing meteors in the early morning hours (the morning of Tuesday, Jan. 4). Modest predicted rates are between 20-40 meteors/hour, with some predictions up to 100/hr (although these meteors tend to be faint).

The radiant is in the north sky near the constellation of Bootes and the Big Dipper. Also known as the Bootids, the Quadrantids are named after the defunct constellation of Quadrant Murales, and is believed to orginate from the Comet 2003 EH1.

Several other minor showers peak during this month as well, but are extremely challenging (and thus not very rewarding!) to see.

If you are interested in observing meteors contact **Tom Giguere** at 782-1308 or at Tom.Giguere@yahoo.com

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Treasurer's Report

by Jim MacDonald

Initial Balance:	\$4,750.42		
Receipts:			
Donations	42.00		
Dues Received	344.00		
Magazine Payments	199.80		
SkyTools Payments	578.00		
Bank Refund	30.39		
Total Income:	\$1,194.19		
Expenses:			
Magazine Subscription	148.93		
Mailing Labels	26.13		
P.O. Box Rent	92.00		
Postage	7.27		
Refreshments	5.23		
Softward Refunds	165.00		
Total Expenses:	\$444.56		
Final Balance	\$5,500.05		

HAS Financial Report for the month ending as of Dec. 15, 2010

Our membership increased by nine this month. New members include Addie Brenner, John Hamill, Bryn and Emily Lai with Andy and Noah, along with Adam and Annie Fimby. Finally, Bill Pigott has rejoined the club. Thanks to Gary Shimazu, Patrick Boyce, and Matthew Martin for their donations. Many membership renewals come due at this time of year so please check your anniversary date on the mailing label. Come join us under the stars soon. It's great fun for everyone.

NEW WEST OAHU STARPARTY VENUE

CHANGE OF VENUE: Our public star parties held on Saturday at Waikele Community Park will be moving effective **February 12**, **2011**. Our new location will be <u>Geiger Community Park</u> located in the Ewa plains area, located at the intersection of Geiger Road and Kapolei Parkway. (The address is listed as 91-1129 Kahiuka Street which is a street fronting one side of the park) The new location and directions have been posted to the Night Sky Network. Astronomers supporting this event will need to park along the street (namely, Kapolei Parkway) since there is a fence surrounding the park with numerous openings. *You cannot park on Geiger Road*. Set up is in the main field between two ball courts. Restrooms are available. The last Public Star Party at Waikele Community Park will be on January 15, 2011.

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Now Voyager 1 is leaving our solar system. What does that mean? Well, the Sun exerts influence in various ways, so the meaning is rather complicated. The Sun's gravity is still much stronger than the pull of any other star on the Voyagers at this point, but they are travelling fast enough to eventually escape. That won't happen for a long time.

Of more immediate concern is the heliosphere. Think of this as a giant bubble blown by the Sun's solar wind. This bubble has no physical membrane to contain it. The solar wind eventually runs into the interstellar medium and slows down. This area is called the termination shock.

The heliosheath is the region where the solar wind and interstellar medium are interacting. The solar wind and interstellar medium become balanced at the heliopause. The outer edge of the bubble is the bow shock, where the interstellar medium runs into the heliosphere.

It is not clear exactly when Voyager 1 reached the termination shock, but it was probably in 2003 or 2004. Now it is near the heliopause, and it is expected to reach that point in about 2015. That's when we will be able to say a human-built object has entered interstellar space. That will be a first to remember.

Chrís



Image credit: NASA/Walt Feimer For more information about this graphic go to: http://www.nasa.gov/vision/universe/solarsystem/voyager-interstellar-terms.html

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The setting moon as seen through a layer of vog, riding on the tops of the clouds (the marine layer caused by a temperature inversion over the pacific ocean). The long exposure used to capture these images makes the moon look very bright. Six of the 'Big Dipper' stars are visible at the top center of the frame.

Image credit: Gemini Observatory/Association of Universities for Research in Astronomy

Place stamp here. Post Office will not deliver mail without proper postage