Imagination is More Important than Knowledge
by Charlie Rykken

When I went to college in Chicago in the mid to late sixties the field of physics was just beginning to go into the particle zoo phase. The sixties also saw the birth of the Higgs field (https://en.wikipedia.org/wiki/Higgs_mechanism) which demonstrated a possible explanation for the creation of mass. Although I was supposed to be a physics major (for one year) I eventually discovered that mathematicians thought in a way that was more to my liking (philosophically, that is). What I found to be so strange was how many of the physicists that I met looked at mathematics as a tool like a telescope to see reality as it really is. In philosophy that is called reification, a big no no among philosopher. I am well aware that most physicists would vigorously deny falling into that trap. The quantum measurement problem is still unresolved but many physicists are like Sean Carroll, die hard materialists. Check out this youtube video https://www.youtube.com/watch?v=pLbSJC0Pucw and ask yourself, have we really got it all figured out or maybe there is a much more wonderful universe to explore.

Upcoming Events:

The next meeting is on Tuesday, July 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., July, 2nd 3:30 PM in POST building at UH.
President’s Message
July 2017

I ran across an interesting idea that I’m going to try using. I wish I could remember where I saw it. It is related to the upcoming eclipse.

We all know that it is dangerous to view the Sun directly, even without optical aid. Most of us are aware that it is dangerous to block sunlight at the eyepiece end of a device because the sunlight has already been magnified and is therefore more intense. That’s why you shouldn’t look through binoculars even if you’re wearing eclipse glasses.

Those same glasses can be used at the other end of the binoculars by cutting holes in the lens caps and securing the filter for one eye in each lens cap. This reduces the incoming sunlight to a safe level. The binoculars can be used to view sunspots on any clear day and to view all of the partial phases of the eclipse.

During totality, the lens caps can quickly come off for binocular views of the totally eclipsed Sun. The corona and any prominences that are present should be visible. I don’t have a small easily portable telescope, so I will work on modifying a set of lens caps in this way for my trip to the mainland to view the eclipse.

I will soon be in contact with those who have indicated their interest in participating in the equipment-sharing star party at Dillingham that I have been discussing in recent months. The July club member event is on July 22nd. I will be asking participants for a list of the equipment they want to include.

Although I haven’t mentioned it before, this is an excellent opportunity to sell any equipment you have for sale. This will be a chance for potential buyers to see,
Planets Close To the Moon
Times are Hawaii Standard Time

July 6, 18h, M 3.2º N of Saturn
(157º from sun in evening sky)
July 13, 08h, M 0.83º SSE of Neptune
(127º from sun in morning sky)
July 16, 16h, M 4.1º SSE of Uranus
(86º from sun in morning sky)
July 20, 02h, M 2.7º S of Venus
(41º from sun in morning sky)
July 24, 23h, M 0.84º N of Mercury
(27º from sun in evening sky)
July 28, 12h, M 3.0º NNE of Jupiter
(70º from sun in evening sky)

Mars is closer than 15º from the sun when near the moon in July.

Other Events of Interest
Times are Hawaii Standard Time

July 1, 20h, Asteroid 3 Juno at opposition
July 3, 10h, Earth at aphelion
(1.01668 AU from sun)
July 8, 18:07h, Moon Full
July 9, 12h, Pluto at opposition.
July 22, 23:46h, Moon New
July 26, 15h, Mars at conjunction with sun
(Passes into morning sky.)
July 29, 19h, Mercury at greatest elongation
(27.2º east of the sun in evening sky)

Planets in July

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<tr>
<th>Mercury</th>
<th>Venus</th>
<th>Mars</th>
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<tr>
<td>♄</td>
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<tr>
<td>Can be seen in the evening twilight the last few days of the month</td>
<td>is about 40º from the sun in July and shines brightly in the morning sky before dawn.</td>
<td>reaches conjunction with the sun this month and cannot be viewed.</td>
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<table>
<thead>
<tr>
<th>Jupiter</th>
<th>Saturn</th>
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<tr>
<td>shines brightly in the evening sky about 70º from the sun.</td>
<td>is in the sky most of the night – best observed late in the evening.</td>
<td>is above Venus in the morning sky.</td>
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<table>
<thead>
<tr>
<th>Neptune</th>
<th>3-Juno (Asteroid)</th>
<th>Pluto (Dwarf Planet)</th>
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<td>is near the meridian just before dawn.</td>
<td>is also at opposition this month at a magnitude of +9.9.</td>
<td>is at opposition this month and so is in the sky all night</td>
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President Chris Peterson called the June 6, 2017 meeting of the Hawaiian Astronomical Society to order at 7:30 p.m. The meeting was held in Planetarium, on the grounds of the Bishop Museum, Honolulu, Hawaii. There were thirty-two members in attendance and eight visitors.

Happy Birthday Chris - The general membership assembled sang “Happy Birthday” to H.A.S. President Chris Peterson, whose birthday takes place on June 7, 2017. Birthday cake and other refreshments were later served to celebrate.

Star Party Report – Cloudy skies hindered viewing at the June 3, 2017, Kahala Community Park suburban star party, as reported by President Chris Peterson. The seeing was tolerable but clouds and intermittent showers marred the evening’s viewing. There were fewer than 30 visitors that night. Out at the Geiger Park venue in West O‘ahu, Vice President Peter Besenbruch reported more favorable conditions.

Mark Watanabe reported that we have one upcoming community outreach activity, in addition to our regularly scheduled dark sky and suburban events.

Boy Scouts – A group of 30 – 40 individuals, boy scouts, parents, siblings and friends will join the astronomers of Geiger Park in Ewa at a get-together on July 29.

President’s Report

Equipment Demonstration Star Party- H.A.S. President Chris Peterson

(Continued from page 2) President’s Report

for example, how an eyepiece performs on their telescope before they buy it. I’m hoping to see the view through some 2” eyepieces on my telescope before I take the plunge into that world.

If the weather looks bad enough far enough in advance, I’ll contact the participants and postpone the event. Let’s hope for clear skies for a fun new activity

Chris Peterson
## Hawaiian Astronomical Society
### Event Calendar

### Upcoming Star Parties

#### Public Party
- **Dillingham July 15** (Chris Peterson)

#### Public Party Geiger July 1 & 29

#### Public Party Kahala July 1 & 29

### Upcoming School Star Parties

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#### Board Meeting
- 3:30 PM

#### Club Meeting
- 7:30 PM

#### Sunset Times

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### July 2017

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<tr>
<th>SUNDAY</th>
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<td>Globe at Night</td>
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<td>7:17 PM Public Star Party(G)</td>
<td>7:17 PM Public Star Party(K)</td>
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<td>Board Meeting</td>
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<td>Club Meeting</td>
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<td>7:15 PM Club Star Party(G)</td>
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<td>Globe at Night</td>
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<td>7:12 PM Public Star Party(G)</td>
<td>7:12 PM Public Star Party(K)</td>
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<td>Club Meeting</td>
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**Globe at Night**
- 7:17 PM Public Star Party(G)
- 7:17 PM Public Star Party(K)
- 7:15 PM Club Star Party(G)
- 7:12 PM Public Star Party(G)
- 7:12 PM Public Star Party(K)
will be setting a date for an “Equipment Comparison Star Party” at Dillingham Airfield on a club star party night hopefully during the month of July of 2017. Chris will be contacting those members who have expressed an interest in bringing their useful and interesting equipment and give a demonstration of their abilities in a working environment. Members will be able to get hands-on experience with equipment they may have been curious about. If you are interested, call Chris Peterson.

Mission Updates – It has been reported that the Dawn spacecraft has experienced further difficulties and appears to be coming to its end. Cassini has made a few more passes through Saturn’s rings without apparent damage. It’s remaining passes are being made so that the cameras will be rolling and recording the events as they happen.

Eclipse Mania – Some members reminisced about the prior solar eclipse and members are urged to share any pictures of the solar event seen on the Big Island of Hawaii in the ‘70s. Send your materials to Peter Besenbruch.

Tom reminded members to make reservations now and lock them in, as accommodation prices are soaring. Beware price gouging as you set out to see the August 21 total solar eclipse on the Mainland U.S. .

Visitors- H.A.S. had seven visitors at this month’s meeting; the Clarke family and the Yongeneelan family.

For Sale – Barry Peckham is selling selected items from two member families. One item up for sale is an eight-inch Orion XT8. He also is offering a 2” O^3 filter for $75.

History Repeats itself – Reminder – The Polynesian Voyaging Society sailing canoe, Hokule`a, returns to Hawaiian waters this week. We are reminded that the Hokule`a will sail into the waters adjacent to Magic Island on June 17th. This is the culmination of a 3-year, round-the-world journey for the voyaging canoe, Hokule`a. The vessel circumnavigated the globe using traditional navigational wayfinding; that is, without the aid of any modern navigational tools or equipment. Crews of navigators made use of the Bishop Museum’s Planetarium to help them prepare for their different navigational legs.

Guest Speaker – Sixteen-year-old Celeste Yongeneelan was our featured speaker this month. Celeste will be a high school senior this coming year. Celeste was the recipients of the Hawaiian Astronomical Society Agency award for Astronomy at this year’s Hawaii State Science and Engineering Fair this past March 2017. She received a year’s membership to the Hawaiian Astronomical Society, and a year’s subscription to the astronomy magazine of her choice. This is her fourth science fair award from H.A.S. She has (Continued on page 14)
When Stamatios (Tom) Krimigis was selected for the Voyager mission in 1971, he became the team’s youngest principal investigator of an instrument, responsible for the Low Energy Charged Particles (LECP) instrument. It would measure the ions coursing around and between the planets, as well as those beyond. Little did he know, though, that more than 40 years later, both Voyager 1 and 2 still would be speeding through space, continuing to literally reshape our view of the solar system.

The solar system is enclosed in a vast bubble, carved out by the solar wind blowing against the gas of the interstellar medium. For more than half a century, scientists thought that as the sun moved through the galaxy, the interstellar medium would push back on the heliosphere, elongating the bubble and giving it a pointy, comet-like tail similar to the magnetospheres—bubbles formed by magnetic fields—surrounding Earth and most of the other planets.

"We in the heliophysics community have lived with this picture for 55 years," said Krimigis, of The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. "And we did that because we didn't have any data. It was all theory."

But now, he and his colleagues have the data. New measurements from Voyager and the Cassini spacecraft suggest that the bubble isn’t pointy after all. It’s spherical.

Their analysis relies on measuring high-speed particles from the heliosphere boundary. There, the heated ions from the solar wind can strike neutral atoms coming from the interstellar medium and snatch away an electron. Those ions become neutral atoms, and ricochet back toward the sun and the planets, uninhibited by the interplanetary magnetic field.

Voyager is now at the edge of the heliosphere, where its LECP instrument can detect those solar-wind ions. The researchers found that the number of measured ions rise and fall with increased and decreased solar activity, matching the 11-year solar cycle, showing that the particles are indeed originating from the sun.

Meanwhile, Cassini, which launched 20 years after Voyager in 1997, has been measuring those neutral atoms bouncing back, using another instrument led by Krimigis, the Magnetosphere Imaging Instrument (MIMI). Between 2003 and 2014, the number of measured atoms soared and dropped in the same way as the ions, revealing that the latter begat the former. The neutral atoms (Continued on page 14)
.Very little information has been collected on the Piscis Austrinids (183 PAU) over the years, so the details on the shower are not well-confirmed, mainly because of the large amount of northern hemisphere summer data, and the almost complete lack of southern hemisphere winter results, on it. Observations are needed to establish the listed parameters.

The Southern Delta Aquariids have a history of variability. Observations made by experienced observers under exceptional observing conditions in 2008 and 2011 show that the maximum ZHR of the southern δ-Aquariids is around 25 for about two days. So, the shower can be more active than the Orionids. During the maximum there are also numerous bright SDA meteors visible. This is obvious as a dip in the r-profile during the maximum period to $r \approx 2.5$ while before and after the maximum the value is much higher ($r \approx 3.1$). The population index, $r$, is a term computed from each shower’s meteor magnitude distribution.

$r = 2.0–2.5$ implies a larger fraction of brighter meteors than average, while $r$ above 3.0 is richer in fainter meteors than average. In past showers there were outbursts observed: Australian observers reported a ZHR

(Continued on page 13)
There is one new member this month. The new member’s name is Renate Ryan.

Many thanks to those renewing their membership (Eugene Shimabukuro and Duane & Joanna Wenzal).

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<td>Astronomical League dues</td>
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<tr>
<td>Total Expenses</td>
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<td>Ending Balance</td>
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NOTICE!
HAS is publishing a complete listing of Club members in the this issue of the Astronews. This publication is required by Club by-laws, Article III, Section 2 Para C(e) and Article VIII, Section 1B. Unless notified otherwise, this list will include all member’s names, addresses, and phone numbers. Please be advised that this listing is intended for Club members’ personal use only in contacting one another. It is not to be used for any commercial or solicitation purposes. With the exception of membership in the Astronomical League, HAS does not make this list available to, nor do we sell its contents to anyone for any purpose. Please respect our member’s right to privacy.

(Continued from page 12) Meteor Log Tom Giguere
of 40 in the night 1977 July 28/29; again a ZHR of 40 was observed for 1.5 hours on 2003 July 28/29 from Crete (unconfirmed). The ZHR before and after the outburst was around 20. The extensive 2011 data set showed no ZHR enhancement at the same solar longitude as in 2003. The activity level and variations of the shower need to be monitored. The first quarter Moon on July 30 leaves the better morning hours undisturbed. While at mid-northern latitudes only a small portion of the shower is visible; however, conditions significantly improve for us as we are further south.

For photo see page 15 ->>>>>>>>---------->>>>>>
must therefore come from the edge of the heliosphere. If the heliosphere were comet-shaped, atoms from the tail would take longer to arrive at MIMI than those from the head. But the measurements from MIMI, which can detect incoming atoms from all directions, were the same everywhere. This suggests the distance to the heliosphere is the same every which way. The heliosphere, then, must be round, upending most scientists' prior assumptions. It's a discovery more than four decades in the making. As Cassini ends its mission this year, the Voyager spacecraft will continue blazing through interstellar space, their remarkable longevity having been essential for revealing the heliosphere's shape.

"Without them," Krimigis says, "we wouldn't be able to do any of this."

To teach kids about the Voyager mission, visit the NASA Space Place: https://spaceplace.nasa.gov/voyager-to-planets

New data from NASA’s Cassini and Voyager show that the heliosphere — the bubble of the sun’s magnetic influence that surrounds the solar system — may be much more compact and rounded than previously thought. Image credits: Dialynas, et al. (left); NASA

(Continued from page 6) Meeting Minutes

received awards twice at the Junior Research level and last year for Senior Research.

Celeste, along with her mother and sister, journeyed from Maui, where she lives and is home-schooled, to be this month’s H.A.S. Guest Speaker. She spoke at length about her second year of research using the Hi-Star data in identifying runaway stars in her talk; the “Social Life of Stars- Fastest Stars in the Universe.”

This past year, with the aid of her mentor, Dr. J.D. Armstrong, Celeste

(Continued on page 15)
Another nice meteor caught in one of those handy Russian dashboard cameras. This fireball was imaged near Moscow on June 21st. Check out the video at this link on youtube: https://youtu.be/J0FdeoUS3A4, ignore the freaky music!

(Continued from page 14) Meeting Minutes

developed an algorithm to sort out from a huge swath of (@ 2 billion) stars, smaller and smaller groups of hypervelocity stars. Her work seeks to, start identifying runaway stars. She is hoping to refine her study and submit a paper to a journal in the future.

Celeste Yongeneelan certainly wowed this and many other H.A.S. members with her clear and concise talk. She fielded questions from the audience like a pro!

Joanne and The Planetarium Tour – Due to problems with the air conditioning in the Planetarium and concern over damaging the delicate equipment therein, Joanne was unable to lead us on another tour of the summer skies over Hawaii. Join us next month, for views of the July skies.

Mahalo – As there was no further business, the meeting was adjourned 8:44 p.m. Post meeting birthday cupcakes, cookies and other goodies were available in the rotunda.

Respectfully Submitted

Gretchen West

H.A.S. Secretary
Evidence from NASA Galaxy Evolution Explorer supports the long-held notion that many galaxies begin life as smaller spirals before transforming into larger, elliptical-shaped galaxies.