

October 2005

**Special points of interest:**

- Telescope Library
- Plastic Spaceships
- Gamma Ray Burst Mystery Solved

## October Meeting:

### Astronomy with Digital SLR Cameras

Jonathan Fay  
Bear Creek Observatory



Image Credit: Jack Newton with Canon Eos 350D

You think images like this are out of your reach? Think again. The DSLR camera has revolutionized daylight photography for the masses and now is turning astrophotography on its head. Results that just 5 years ago would have cost 30 thousand dollars to produce, can now be achieved for well under \$3000 complete with a DSLR camera an economical scope, an inexpensive auto guider and a laptop computer and today's astronomy software.

Jonathan Fay is a software developer and amateur astronomer who turned his software talents to give DSLR cameras the software support they needed to act like high-end astronomy cameras. He will present a discussion, slideshow and real time demonstration of DSLR and alternative imaging for the cost conscious, but quality obsessed. He has also built his own observatory from the ground up. You can read more about it at [www.bearcreekobservatory.com](http://www.bearcreekobservatory.com). Note: This talk has been rescheduled from September to October.

## Meeting Information

Wednesday, October 19  
7:30 p.m.

Physics-Astronomy Building  
Room A102  
University of Washington  
Seattle

*Come early at 7 p.m. for coffee  
and snacks and to visit with  
your fellow members!*

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# Seattle Astronomical Society

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## From the President's Desk...

### *Telescope Library*

*By Thomas Vaughan*

### *Telescope Library*

The telescope cleaning was a big success! We were able to clean and collimate a number of telescopes. Take advantage of the hard work of many of our volunteers, and try out one of the many scopes available. Want a larger scope to see the Mars opposition at the end of October? We have several 6" Newtonian reflectors, a large 8" Dobsonian, and an 8" Schmidt-Cassegrain that members can use.

### *Elections*

SAS Elections are this November, at the SAS meeting on the 16th. Are you interested in helping out the Society by running for office, or know someone who is? If so, feel free to contact me, or show up and be nominated at the November meeting.

### *Dark Sky Site*

We are still fundraising for the Dark Sky Site! Have you joined as a dark sky member? If not, please visit the website at <http://www.seattleastro.org/dark-sky.html>, and fill out a membership form.

Happy Observing-  
-Thomas

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### **Award Announcement**

Let us congratulate Burley Packwood on receiving the Astronomical League Galaxy Groups and Clusters Certificate on September 13<sup>th</sup>!  
Well done!





## Seattle Astronomical Society

### Dark Sky Fundraising

Name	
Street Address	
City	
State	
Zip Code	
Phone Number	
Email Address	

Ways to contribute:

Contribution	Cost	Total
Dark Sky Membership (must also be an SAS member)	\$250 membership fee. (+ \$60/year) Only the membership fee is due at this time. Not tax-deductible.	
Donation	Tax-deductible.	

Only Dark Sky Members are able to use the site at-will. Once purchased, a Dark Sky Member can sell his/her membership to another SAS member. The new owner of the Dark Sky Membership will have to pay the yearly fees.

Dark Sky yearly fees will be charged once a dark sky site is acquired. You do *not* need to include yearly fees with this payment.

If a Dark Sky site is not acquired by January 2007, donations and membership fees will be returned, less a pro rata portion of expenses. The January 2007 date can be extended by the SAS Board if they feel a purchase is imminent.

Cut out and mail this form and payment to the Seattle Astronomical Society at:

Dark Sky Site, Seattle Astronomical Society, PO Box 31746, Seattle, WA 98103-1746

Not an SAS member? Fill out a membership form on page 15 or at

<http://www.seattleastro.org/membership.html>

# SAS September 2005 Club Meeting Minutes

*Bruce Kelley presiding in Thomas Vaughan's absence.*



## Announcements:

Bruce introduced a new idea for the monthly general meetings: a short discussion of a basic astronomy topic, geared mainly to new members or anyone new to amateur astronomy. Three new members were present at the meeting and were welcomed to SAS.

Ed would like to end his very long career as the "coffee and cookie" detail for the monthly meetings. Anyone interested in taking over this important task, please contact Ed. Many thanks to Ed for his longtime dedication!

Tim from Captain's Nautical announced that Captain's will be having a house-cleaning "garage sale" on Saturday 10/22 from 9AM to 5PM. Many miscellaneous and varied astronomy items will be for sale.

## Meeting Topic:

The scheduled speaker was unable to make the meeting due to illness, so various members contributed to the meeting.

Al and Randy talked about their experience on Sep. 23<sup>rd</sup> in viewing the large and highly active sun spot #798. Randy had done a superb sketch of what he observed in his Questar telescope and described the unusually good solar observing he enjoyed that day.

Maxine Nagel shared her "first light" full moon photos taken with her new D20 digital camera.

Bruce Kelley presented the first "basic astronomy" topic, "magnitude" and provided an excellent presentation on the topic with much valuable information for all.

Bob Suryan showed and talked briefly about three books in his "recommended reading" list: "Miss Leavitt's Stars", "Sex and Rockets" and "The Radioactive Boy Scout".

Meeting was adjourned around 8:30PM.

# Plastic Spaceships

[By Patrick L. Barry and Dr. Tony Phillips]



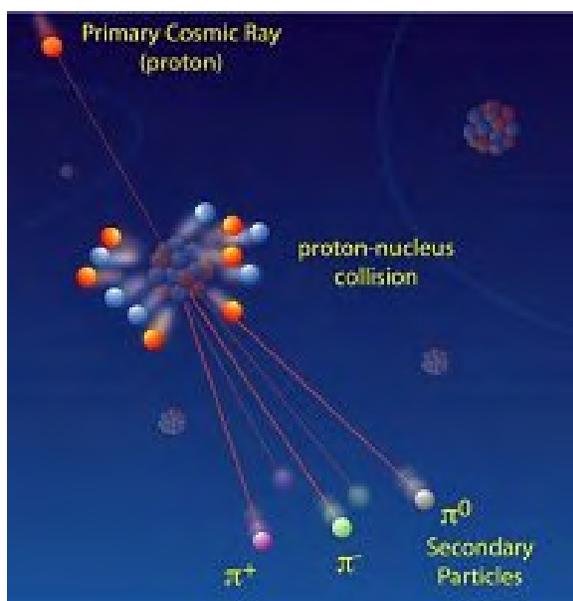
**A new material named RXF1 derived from ordinary household plastic trash bags could help protect astronauts on their way to Mars**

After reading this article, you might never look at trash bags the same way again.

We all use plastic trash bags; they're so common that we hardly give them a second thought. So who would have guessed that a lowly trash bag might hold the key to sending humans to Mars?

Most household trash bags are made of a polymer called polyethylene. Variants of that molecule turn out to be excellent at shielding the most dangerous forms of space radiation. Scientists have long known this. The trouble has been trying to build a spaceship out of the flimsy stuff.

But now NASA scientists have invented a groundbreaking, polyethylene-based material called RXF1 that's even stronger and lighter than aluminum. "This new material is a first in the sense that it combines superior structural properties with superior shielding properties," says Nasser Barghouty, Project Scientist for NASA's Space Radiation Shielding Project at the Marshall Space Flight Center.



*Cosmic rays crash into matter, producing secondary particles.*

To Mars in a plastic spaceship? As daft as it may sound, it could be the safest way to go.

## Less is more

Protecting astronauts from deep-space radiation is a major unsolved problem. Consider a manned mission to Mars: The round-trip could last as long as 30 months, and would require leaving the protective bubble of Earth's magnetic field. Some scientists believe that materials such as aluminum, which provide adequate shielding in Earth orbit or for short trips to the Moon, would be inadequate for the trip to Mars.

Barghouty is one of the skeptics: "Going to

Mars now with an aluminum spaceship is undoable," he believes.

Plastic is an appealing alternative: Compared to aluminum, polyethylene is 50% better at shielding solar flares and 15% better for cosmic rays.

The advantage of plastic-like materials is that they produce far less "secondary radiation" than heavier materials like aluminum or lead. Secondary radiation comes from the shielding material itself. When particles of space radiation smash into atoms within the shield, they trigger tiny nuclear reactions. Those reactions produce a shower of nuclear byproducts -- neutrons and other particles -- that enter the spacecraft. It's a bit like trying to protect yourself from a flying bowling ball by erecting a wall of pins. You avoid the ball but get pelted by pins. "Secondaries" can be worse for astronauts' health than the original space radiation!

Ironically, heavier elements like lead, which people often assume to be the best radiation shielding, produce much more secondary radiation than lighter elements like carbon and hydrogen. That's why polyethylene makes good shielding: it is composed entirely of lightweight carbon and hydrogen atoms, which minimizes secondaries.

These lighter elements can't completely stop space radiation. But they can fragment the incoming radiation particles, greatly reducing the harmful effects. Imagine hiding behind a chain-link fence to protect yourself in a snowball fight: You'll still get some snow on you as tiny bits of snowball burst through the fence, but you won't feel the sting of a direct hit from a hard-packed whopper. Polyethylene is like that chain link fence.

"That's what we can do. Fragmenting -- without producing a lot of secondary radiation -- is actually where the battle is won or lost," Barghouty says.

### **Made to order**

Despite their shielding power, ordinary trash bags obviously won't do for building a spaceship. So Barghouty and his colleagues have been trying to beef-up polyethylene for aerospace work.

That's how Shielding Project researcher Raj Kaul, working together with Barghouty, came to invent RXF1. RXF1 is remarkably strong and light: it has 3 times the tensile strength of aluminum, yet is 2.6 times lighter -- impressive even by aerospace standards.

(Read more at: [http://www.nasa.gov/vision/space/travelinginspace/25aug\\_plasticspaceships.html](http://www.nasa.gov/vision/space/travelinginspace/25aug_plasticspaceships.html))



# October 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat	
						1 Tiger Mountain/Poo Poo Point Star Party	
2	●	3	4	5 UW Campus Observatory public viewing night	6	7	8 Green Lake Star Party Paramount Park Star Party
9	◐	10	11	12	13 UW Astronomy Colloquium	14	15 Amateur Telescope Makers SIG Meeting
16	○	17	18	19 SAS Meeting UW Campus Observatory public viewing night	20 UW Astronomy Colloquium	21	22
23	24 SAS Board Meeting	◐	25	26	27 UW Astronomy Colloquium	28	29 Tiger Mountain/Poo Poo Point Star Party
	31						



# November 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	 2 UW Campus Observatory public viewing night	3 UW Astronomy Colloquium	4	5 New Member Orientation Meeting Green Lake Star Party Paramount Park Star Party
6	7	8	 9	10 UW Astronomy Colloquium	11	12
13 Astrophotography/ Imaging SIG Meeting	14	15	 16 SAS Meeting UW Campus Observatory public viewing night	17 UW Astronomy Colloquium	18	19 Amateur Telescope Makers SIG Meeting
20	21 SAS Board Meeting	22	 23	24	25	26 Tiger Mountain/Poo Poo Point Star Party
27	28	29	30			

# Where No Spacecraft Has Gone Before

[by Dr. Tony Phillips]



In 1977, Voyager 1 left our planet. Its mission: to visit Jupiter and Saturn and to study their moons. The flybys were an enormous success. Voyager 1 discovered active volcanoes on Io, found evidence for submerged oceans on Europa, and photographed dark rings around Jupiter itself. Later, the spacecraft buzzed Saturn's moon Titan— alerting astronomers that it was a very strange place indeed! —and flew behind Saturn's rings, seeing what was hidden from Earth.

Beyond Saturn, Neptune and Uranus beckoned, but Voyager 1's planet-tour ended there. Saturn's gravity seized Voyager 1 and slingshot it into deep space. Voyager 1 was heading for the stars—just as NASA had planned.

Now, in 2005, the spacecraft is nine billion miles (96 astronomical units) from the Sun, and it has entered a strange region of space no ship has ever visited before.

"We call this region 'the heliosheath.' It's where the solar wind piles up against the interstellar medium at the outer edge of our solar system," says Ed Stone, project scientist for the Voyager mission at the Jet Propulsion Laboratory.

Out in the Milky Way, where Voyager 1 is trying to go, the "empty space" between stars is not really empty. It's filled with clouds of gas and dust. The wind from the Sun blows a gigantic bubble in this cloudy "interstellar medium." All nine planets from Mercury to Pluto fit comfortably inside. The heliosheath is, essentially, the bubble's skin.

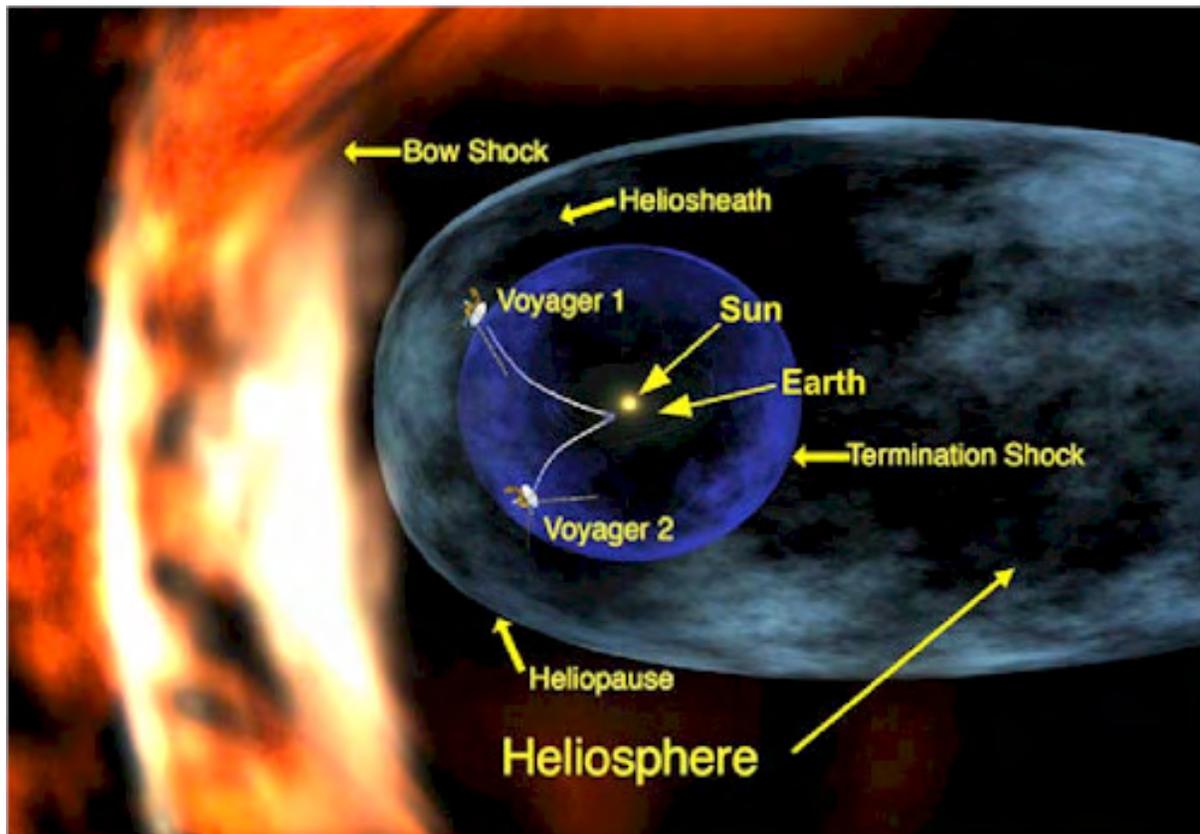
"The heliosheath is different from any other place we've been," says Stone. Near the Sun, the solar wind moves at a million miles per hour. At the heliosheath, the solar wind slows eventually to a dead stop. The slowing wind becomes denser, more turbulent, and its magnetic field—a remnant of the sun's own magnetism--grows stronger.

So far from Earth, this turbulent magnetic gas is curiously important to human life. “The heliosheath is a shield against galactic cosmic rays,” explains Stone. Subatomic particles blasted in our direction by distant supernovas and black holes are deflected by the heliosheath, protecting the inner solar system from much deadly radiation.

Voyager 1 is exploring this shield for the first time. “We’ll remain inside the heliosheath for 8 to 10 years,” predicts Stone, “then we’ll break through, finally reaching interstellar space.”

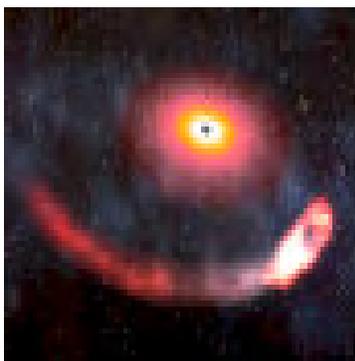
What’s out there? Stay tuned...

For more about the twin Voyager spacecraft, visit [voyager.jpl.nasa.gov](http://voyager.jpl.nasa.gov). Kids can learn about Voyager 1 and 2 and their grand tour of the outer planets at [spaceplace.nasa.gov/en/kids/vgr\\_fact3.shtml](http://spaceplace.nasa.gov/en/kids/vgr_fact3.shtml).



*Voyager 1, after 28 years of travel, has reached the heliosheath of our solar system.*

## Space Bits



*Artist illustration of a black hole consuming a neutron star. Image credit: Dana Berry/NASA*

### **Gamma Ray Burst Mystery Solved**

An international team of astronomers think they've solved the mystery of short gamma-ray bursts. These powerful explosions shine brighter than a billion suns for only a few milliseconds and fade away quickly. But now, thanks to NASA's Swift satellite, which can detect and analyze these blasts anywhere in the sky, astronomers were able to measure short bursts. The evidence now points to the theory that these bursts occur when a black hole consumes a neutron star, or two neutron stars collide together.

Link: [http://www.universetoday.com/am/publish/grb\\_mystery\\_solved.html?5102005](http://www.universetoday.com/am/publish/grb_mystery_solved.html?5102005)



### **NASA Finds 'Big Baby' Galaxies in Newborn Universe**

Two of NASA's Great Observatories, the Spitzer and Hubble Space Telescopes, have teamed up to "weigh" the stars in several distant galaxies. One of these galaxies, among the most distant ever seen, appears to be unusually massive and mature for its place in the young universe.

Link: <http://www.spitzer.caltech.edu/Media/releases/ssc2005-19/release.shtml>

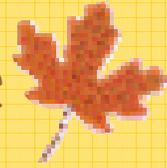


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Link: <http://www.spitzer.caltech.edu/Media/releases/ssc2005-19/release.shtml>

# SAS Dark Sky Site

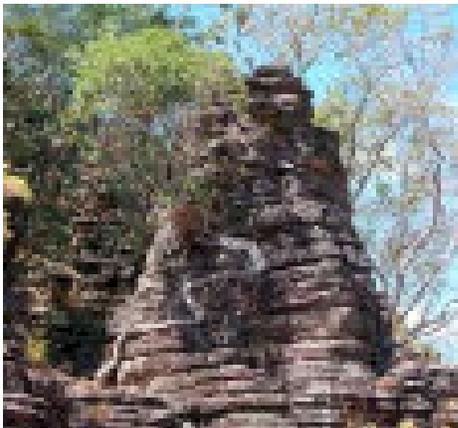


Missing the sunny skies and clear nights of summer?

Just imagine what it would be like  
to drive to a dark sky site and camp out  
for a night of superb viewing!

Fundraising is continuing and we need your help.  
Fill out a membership form on page 4 and join today!

**[http://www.seattleastro.org/  
dark-sky.html](http://www.seattleastro.org/dark-sky.html)**



*Rock formation in northern Australia.  
Image credit: Jochen J. Brocks.*

## Early Earth Had Toxic Oceans

Researchers from NASA have confirmed that it would have been impossible for advanced life forms, like fish or mammals, to live in the Earth's early oceans because it was such a toxic environment. The scientists studied ancient rock formations, and found evidence of photosynthetic bacteria living as recently as 1.6 billion years ago. This bacteria would have required both sunlight and an environment rich in hydrogen sulfide - this environment would have been quite toxic for air breathing creatures

Link: [http://www.universetoday.com/am/publish/  
early\\_earth\\_toxic\\_oceans.html?7102005](http://www.universetoday.com/am/publish/early_earth_toxic_oceans.html?7102005)

## We promise you the sun, moon and stars and we deliver...

The Seattle Astronomical Society is an organization created and sustained by people who share a common interest in the observational, educational, and social aspects of amateur astronomy. Established in 1948, the SAS is a diverse collection of over 200 individuals. A variety of programs and activities is presented by the SAS throughout the year. Monthly meetings feature speakers on a wide range of topics, from the Hubble Space Telescope to electronic imaging to personal observing experiences. The club holds public observing "star parties" at Green Lake every month, dark sky observing parties outside Seattle, plus such activities as meteor watches, public telescope and astronomy displays, National Astronomy Day, and an annual Awards Banquet.



We're on the Web!  
[www.seattleastro.org](http://www.seattleastro.org)



### The Seattle Astronomical Society

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- 1 year of Sky and Telescope Magazine (optional) \$33.00
- 1 year of Astronomy Magazine (optional) \$30.00
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