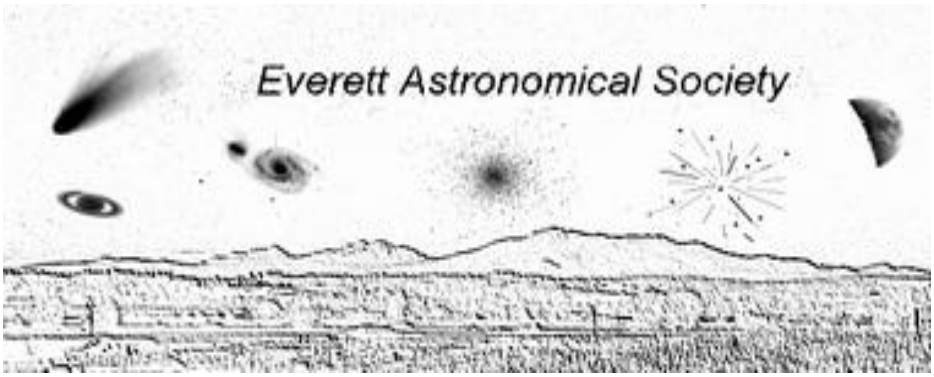
Volume MMX No. 7



The Stargazer

July 2010

President:	Mark Folkerts	(425) 486-9733	folkerts at seanet dot com	***The Stargazer***
Programs:	Ron Mosher		mosheriffic69 at comcast dot net	**P.O. Box 12746**
Librarian:	Chris Dennis		--	**Everett, WA 98206**
Treasurer:	Jerry Galt		jerryg at genwest dot com	
'Planetarium' column	John Goerger		pos1 at earthlink dot net	
Web assistance:	Cody Gibson		cgibson41 at austin.rr dot com	*See EAS website at:*
Vice President:	<open>		(change 'at' to @, dot to. to send email)	http://everettastro.org

EAS BUSINESS…

LAST (JULY) EAS MEETING - - WAS SATURDAY JULY 17TH

July's meeting was July 17th, featuring EAS Programs Chairperson Ron Mosher, demonstrating several highly-capable low-or-no-cost astronomy software programs. Thank you, Ron.

AUGUST EAS MEETING - - SATURDAY AUG 21ST - 3:00 PM

Tom Field will give a presentation 'Real Time Spectroscopy with RSpec' using his new software program "RSpec" that does real-time astronomical spectroscopy. He will review a bit of the history and science around spectroscopy and then discuss various projects that amateurs can undertake. As many members know, spectroscopy is one of the primary tools that are used in astronomical research. If you've got a DSLR, webcam, or classical CCD and almost any telescope, then RSpec and a simple grating is all you need to get involved in this interesting aspect of astronomy. Tom says, "*Spectroscopy isn't rocket science, but it is one of the last frontiers for amateurs to get involved in on a large scale. It's exciting to be able to actually see the composition of stars with some simple backyard gear. And, once you have some hands-on spectroscopy experience, you'll find that a lot of the articles in Sky & Telescope and on the web take on a whole new meaning in light of your new understanding of the field*." Meeting is at the ***Evergreen branch*** of the ***Everett Public Library*** (*not main downtown branch*) located at 9512 Evergreen Way. - Website · Directions

Attending members will be eligible for a monthly door prize.

NEW MEMBER / BEGINNERS CLASS WITH JACK BARNES

The next class is the 27th of July.
They are set for the 4th Tuesday of each month.

★ STAR PARTY INFO ★

★ Scheduled EAS Star Parties at Ron Tam's: ★

Next star party at Ron's is August 6th

Star Party dates for 2010 – weather permitting.
(Note they are on Friday nights.)
Sep 10 Oct 8 Nov 5 Dec 3

EAS member Ron Tam has offered a flexible opportunity to EAS members to come to his home north of Snohomish for observing on clear weekend evenings and for EAS star parties. Anyone wishing to do so needs to contact him in advance and confirm available dates, and let him know if plans change**.** *"Our place is open for star parties any Saturday except weekends of the Full Moon. People can call to get weather conditions or to confirm that there is a star party. Our phone number is (360) 568-5152. They can e-mail me too (tam1951@verizon.net) but I don't check my email daily. They can email me for directions if they never have been out here."* Listed below are proposed dates for **planned EAS star parties** at my [Ron Tam's] place, depending upon the weather, of course. Call Ron about spur-of-the-moment observing.

Please also join the EAS e-mail list, and then send mail to the mail list at ***everett_astronomy@topica.com*** to coordinate spur-of-the-moment observing get-togethers, on nights when the sky clears. We try to hold informal close-in star parties each month during the spring, summer, and fall months on a weekend near the New moon at a member's property or a local park.

Other Western US Star Parties This Season

AUGUST -

Deception Pass Star Party - Bowman Bay - August 6-7: Two nights of telescope viewing and camping with members of the local astronomy clubs. There will also be an evening lecture at sunset both nights on the basics of astronomy. Usually, have about 10 - 15 telescopes out for viewing after. (This is the weekend before the Table Mountain Star Party, so it's a chance to make sure everything works before the trip up the mountain the next weekend.) If interested in coming, please send an email (click here) and let us know how many are coming.. Information about Bowman Bay

Aug 6-7 - **Deception Pass Star Party,** Bowman Bay, Deception Pass, - http://www.eastsideastro.org/
http://www.parks.wa.gov/parks/?selectedpark=Deception%20Pass&subject=all

Aug 4-6 - 19th Annual 'Weekend Under the Stars', Foxpark WY - http://home.bresnan.net/~curranm/wuts.html

Aug 6-8 - RCA Maupin Dark Sky Star Party, Maupin, OR - http://www.rca-omsi.org/sp/maupin.htm

Aug 7 – RCA White River Canyon star party, Mt. Hood OR. - http://www.rca-omsi.org/sp/whiteriver.htm

Aug 7-15 - Mt. Kobau Star Party (MKSP), Mt. Kobau, near Osoyoos BC http://www.mksp.ca/

Aug 12-15 - Table Mt. Star Party (TMSP), Ellensburg WA http://www.tmspa.com/

Aug 11-15 - Oregon Star Party (OSP), Ochocco NF http://www.oregonstarparty.org/

Aug 13-15 - Island Star Party (ISP), Victoria Fish & Game Assoc - Holker Place, Metchosin (near Victoria), BC, CA http://victoria.rasc.ca/events/StarParty/ http://www.starfinders.ca/starparty.htm

Aug 12 - OMSI-RCA Perseid Meteor Shower Star Party, Rooster Rock State Park & Stub Stewart State Park, OR http://www.rca-omsi.org/sp/sp_schedule.htm

SEPTEMBER -

Sep 2 (Labor Day) - SAS Brooks Memorial Park Star Party, SR 97 near Goldendale - http://www.seattleastro.org/events.shtml

Sep 3-5 - RCA Maupin Dark Sky Star Party, Maupin, OR - http://www.rca-omsi.org/sp/maupin.htm

Sep 4-11 - Merritt Star Quest - Loon Lake Road - Merritt, BC - http://www.merrittastronomical.com/

Sep 9-11 - Orion Nebula 2010 Star Party, Table Mt. (Ellensburg) WA http://www.seattleastro.org/orionnebsp.shtml

Sep 10-12 - Idaho Star Party, Bruneau Dunes State Park - http://ifastro.org/web/index.php (Boise AS) http://www.boiseastro.org/

Sep 11-12 - **White Sands Star Party**, Alamogordo/White Sands, NM - http://www.zianet.com/wssp/

Sep 10-12 - RCA Dark Sky Camp Weekend, Camp Hancock, OR - http://www.rca-omsi.org/sp/sp_schedule.htm

Sep 07-09 - CalStar, Lake San Antonio Park CA http://www.sjaa.net/calstar/ - http://www.sjaa.net/

Sep 10-12 - Craters of the Moon Star Party, Craters of the Moon Nat. Monument, ID http://ifastro.org/web/index.php http://www.boiseastro.org/

Sep 11-12 - Alberta Star Party, Starland Recreation Area Campground near Drumheller, Alberta, CA http://www.astronomycalgary.com/events/info/155 http://calgary.rasc.ca/asp2010.htm

OCTOBER -

Oct 8-11 - OAS Camp Delany Fall Star Party, Sun Lakes SP - http://www.olympicastronomicalsociety.com/Documents/FALLCAMPDELANYSign-UpForm.pdf

Oct 7-9 - Sun River Star Party, Brothers, OR http://www.rca-omsi.org/sp/sp_schedule.htm

Oct 6-10 - The Enchanted Skies Star Party, Socorro NM - http://enchantedskies.org/

(tba) - **All Arizona Star Party** (near Arizona City, AZ) - http://www.eastvalleyastronomy.org/aasp.htm

NOVEMBER -

Nov 4-7 - Nightfall, Palm Canyon Resort, Borrego Springs, CA http://www.rtmcastronomyexpo.org/nightfall.htm

! Likely cancelled ! - Night Under the Stars, Alamo Lake, AZ - http://azstateparks.com/Parks/ALLA/events.html
(closing due to state budget cuts)

Other Star Parties:
http://www.cloudynights.com/ubbthreads/showflat.php/Cat/0/Number/2858373/Main/2858366

2010 ASTRO CALENDAR

July 2010

Jul 06 - Earth At Aphelion (1.017 AU From Sun)
Jul 17 – EAS Meeting – Saturday 3:00 pm Evergreen Branch Library
Jul 27 – New member meeting at Jack Barnes
Jul 29 - South Delta-Aquarids Meteor Shower Peak

August 2010

Aug 01 - Alpha Capricornids Meteor Shower Peak
Aug 05 - Neil Armstrong's 80th Birthday (1930)
Aug 06-07 - **Deception Pass Star Party**
Aug 06 - EAS star party at Ron Tam's place
Aug 06 - Southern Iota Aquarids Meteor Shower Peak
Aug 07 - Mercury At Its Greatest Eastern (evening) Elongation (27 Deg)
Aug 09 - New Moon
Aug 12-15 Table Mt. Star Party, NW of Ellensburg, WA
Aug 11-15 Oregon Star Party, Ochocco Natl. Forest, Prineville OR
Aug 21 – EAS Meeting – Saturday 3:00 pm Evergreen Branch Library
Aug 12 - Perseids Meteor Shower Peak
Aug 20 - Venus at Its Greatest Eastern (evening) Elongation (46 Deg)
Aug 20 - Neptune at Opposition
Aug 25 - Northern Iota Aquarids Meteor Shower Peak

September 2010

(Labor Day) - SAS Brooks Memorial Park Star Party
Sep 10 - EAS star party at Ron Tam's place
Sep 9-11 - Orion Nebula 2010 Star Party
Sep 14 - John Dobson's 95th Birthday (1915)
Sep 19 - Mercury At Its Greatest Western (morning) Elongation (18 Deg)
Sep 21 - Jupiter at Opposition
Sep 27 – EAS Meeting - Saturday 3:00 pm Evergreen Branch Library
Sep 21 - Uranus at Opposition
Sep 23 - Autumnal Equinox (03:09 UT)

October 2010

Oct 08 - EAS star party at Ron Tam's place
Oct 09 - Draconids Meteor Shower Peak
Oct 16 - Astronomy Day (Autumn)
Oct 17 - New Horizons, Halfway to Pluto
Oct tba - EAS Meeting
Oct 21 - Orionids Meteor Shower Peak
Oct 31 - Michael Collins' 80th Birthday (1930)

November 2010

Nov 01 - Daylight Savings - Set Clock Back 1 Hour (USA)
Nov 03 - Taurids Meteor Shower Peak
Nov 05 - EAS star party at Ron Tam's place
Nov 05 - Moon Occults Venus
Nov tba - EAS Meeting
Nov 17 - Leonids Meteor Shower Peak
Nov 25 - Asteroid 2002 KL3 Near-Venus Flyby (0.03 AU)

December 2010

Dec 03 - EAS star party at Ron Tam's place
Dec 06 - Moon Occults Mars
Dec 13 - Geminids Meteor Shower Peak
Dec 21 - Total Lunar Eclipse
Dec tba - EAS Holiday Meeting
Dec 21 - Winter Solstice, 23:38 UTC
Dec 22 - Ursids Meteor Shower Peak

OBSERVER'S INFORMATION…

LUNAR FACTS

Jul 18	First Quarter Moon
Jul 26	Full Moon
Aug 03	Last Quarter Moon
Aug 10	New Moon
Aug 16	First Quarter Moon
Aug 24	Full Moon
Sep 01	Last Quarter Moon
Sep 08	New Moon
Sep 15	First Quarter Moon
Sep 23	Full Moon
Oct 01	Last Quarter Moon
Oct 08	New Moon

UP IN THE SKY -- THE PLANETS (AND PLUTO)

Object	*Rises*	*Sets*	*Con*	*Diam.*	*Mag*
Sun	***05:37 am***	***20:54***	***Can***	***30'***	***-27.5***
Mercury	**07:46 am**	**21:56**	**Leo**	**06"**	**-0.1**
Venus	**09:38 am**	**22:38**	**Leo**	**19"**	**-4.2**
Mars	**10:38 am**	**22:59**	**Vir**	**5"**	**+1.5**
Jupiter	**23:09**	**11:18 am**	**Psc**	**45"**	**-2.6**
Saturn	**10:52 am**	**23:14**	**Vir**	**17"**	**+1.1**
Uranus	**23:00**	**11:04 am**	**Psc**	**04"**	**+5.8**
Neptune	**21:53**	**08:09 am**	**Aqr**	**02"**	**+7.9**
Pluto	**18:34**	**03:54 am**	**Sag**	*****	**+14.0**

(*times listed are in local time for Everett PDT*)

UW Astronomy Speakers Colloquium Schedule

Astronomy Department weekly colloquium meets Thursdays at 4:00 pm in PAB A102 - the classroom part of the Physics/Astronomy Building complex. http://www.astro.washington.edu/pages/colloquium.html

'IT'S OVER YOUR HEAD' – ASTRONOMY PODCASTS

Web page with lots of archives and other info is available at http://www.celestialnorth.org/radio/index.php and podcasts at http://www.celestialnorth.org/radio/index.php

KPLU 88.5 FM National Public Radio has daily broadcasts of "Star Date" by the McDonald Observatory of the University of Texas at Austin, Monday through Friday at about 6:05 pm. The short 2 minute radio show deals with current topics of interest in astronomy. The University of Washington TV broadcasts programs from NASA at 12:00 AM Monday through Friday, 12:30 AM Saturday, and 1:30 AM Sunday on the Channel 27 cable station.

EAS MEMBER NEWS

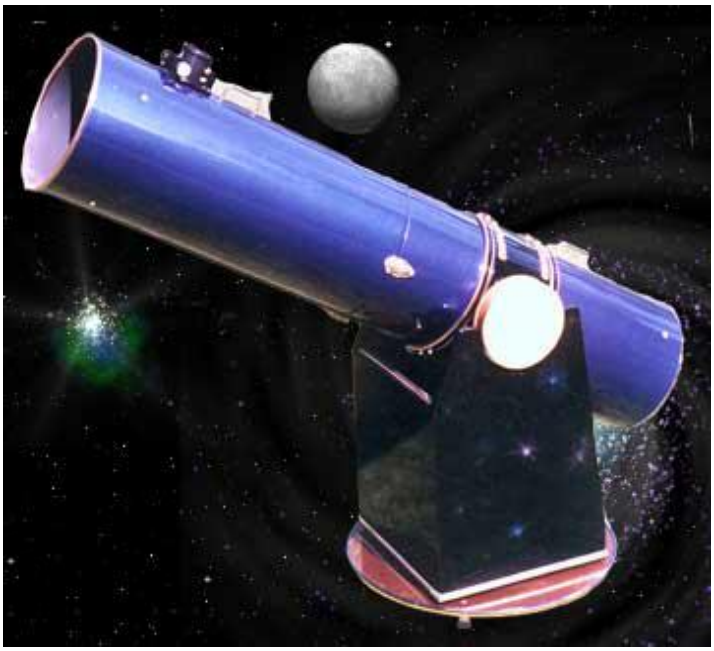
EAS volunteers Bill Carberry, Ron Tam, and Mark Folkerts conducted a star party for a nonprofit group July 18th at Camp Huston, just off SR-2 at Wallace Falls state park. Thank you to the volunteers !

$$ - FINANCIAL HEALTH - $$

The club currently maintains a $425+ balance. We try to keep approximately a $500 balance level to allow for contingencies.

Funds obtained from membership dues allows the EAS to publish the Stargazer newsletter, pay Astronomical League dues, pay insurance, host a web site, and maintain our library.

CLUB SCOPES



EAS Club Telescope Borrowing -
Being a member also allows you the use of the club's telescopes, including an award winning 10 inch Dobsonian mount reflector, a second 10" dob, or and 8" Dobsonian. Contact Ron Tam, or Jim Bielaga (425) 337-4384 to borrow a telescope.

SCOPE	LOAN STATUS
13-INCH THIN-MIRROR DOB	FINISHING REHAB
10-INCH WARD DOBSONIAN	**CURRENTLY ON LOAN**
10-INCH SONOTUBE DOBSONIAN	AVAILABLE
8-INCH DOBSONIAN	**CURRENTLY ON LOAN**
25-INCH MIRROR	CHARACTERIZATION

A 25-INCH MIRROR HAS BEEN DONATED TO THE CLUB, AND INVESTIGATION IS UNDER WAY TO DETERMINE WHAT WOULD BE REQUIRED TO TURN IT INTO A LARGE CLUB TELESCOPE. IF YOU HAVE INTEREST OR SKILLS IN MIRROR TESTING OR TELESCOPE MAKING, PLEASE LET US KNOW.

EAS members: contact Ron Tam to borrow a scope for up to 60 days.

EAS MEMBERSHIP BENEFITS & INFORMATION

EAS Benefits - Membership in the Everett Astronomical Society (EAS) includes invitations to all of the club meetings and star parties, and entitles members to the monthly newsletter, *The Stargazer.* Only members may vote in EAS elections, or be eligible for EAS drawings.

Magazine Discounts –
In addition you will be able subscribe to ***Sky and Telescope*** for $7 off the normal subscription rate, contact the treasurer (Jerry Galt) for more information. http://everettastro.org/application.htm (**When renewing your subscription to *Sky & Telescope* you should send your S&T renewal form along with a check made out to Everett Astronomical Society to the EAS address.** The EAS treasurer Jerry Galt will renew your *Sky and Telescope* subscription for you. **Astronomy** magazine offers a similar opportunity to club members.)

Membership in the Astronomical League -
EAS is a member of the **Astronomical League** and you will receive the Astronomical League's quarterly newsletter magazine, ***The Reflector***.

EAS Library -
Membership will give you access to all the material in the lending library. The library, consists of VCR tapes, DVDs, many books, magazines, and software titles. The EAS has a library of books, videotapes, and software for members to borrow,\. We always value any items you would like to donate to this library. You can contact club librarian to borrow or donate any materials. See library items list here: http://everettastro.org/eas_library.htm

Joining or Renewing with the EAS -

EAS dues are $25 / year per family. If it has been a year since you paid your dues, please re-subscribe to keep the club financially solvent, and to continue to receive membership benefits. http://everettastro.org/application.htm

>> Members – please check to see when your membership dues are payable. If you are more than three months past due, the club will officially assume that you no longer wish to be a member, and remove you from the membership rolls. <<

Send your annual dues renewals to the
Everett Astronomical Society
P.O. Box 12746, Everett, WA 98206.

Those who have **subscriptions to Sky and Telescope** can now pay their own subscription as long as they are EAS members in good standing. Members will now be able to renew directly via mail or phone and still obtain the club discount. The subscribers may mail in the renewal notices with their payment, or renew via phone at (800) 253-0245. Payment at the time of renewal is required. Once a year, Sky and Telescope will check with the EAS club treasurer to see that the subscribers are still members in good standing to qualify for the discount. New members will continue to subscribe through the club treasurer.

Digital Lunar Orbiter Photographic Atlas of the Moon

The Lunar and Planetary Institute has created a digital version of the Lunar Orbiter Photographic Atlas of the Moon, and Consolidated Lunar Atlas available online at:
http://www.lpi.usra.edu/research/cla/menu.html
http://www.lpi.usra.edu/research/lunar_orbiter

Observing Jupiter's Moons – Java tool

http://skytonight.com/observing/objects/javascript/jupiter

Transit times for Jupiter's Great Red Spot in 2010

http://skytonight.com/observing/objects/planets/3304091.html

NOAA Sun Calculator

Need to know exactly what time the sun will set on Sept. 26, 2065? Or when it rose in 565 BC? How about the length of daylight a week from Tuesday in Albuquerque, N.M.? Just go to NOAA's solar calculator, now available on the Web. http://www.srrb.noaa.gov/highlights/sunrise/gen.html

Offices Still Vacant for 2010 -

Vice president: Run monthly meetings if President is absent, and store/loan club telescopes.

Newsletter Co-editor #2: Contribute columns or articles for the StarGazer on a regular basis.

Publicity chairperson: Contact news media, and e-mail and blog to raise public awareness of EAS activities.

Outreach chairperson: Coordinate requests from public for EAS member volunteers to conduct star parties or presentations at visits to schools, senior centers, scout meetings, etc. We often have requests for members of the EAS to come and help with an 'astronomy night' event from local schools, scout groups, senior homes, or similar groups. Usually this would be in the form of a star party at their gathering, or perhaps a short slide show or night sky talk. Providing education and support to the community about interest astronomy is one of the main missions of the EAS. A star party night can be a rewarding event for all involved. **Please email Mark Folkerts with your interest (or suggestions).**

Sidewalk astronomy committee: Plan and conduct urban/suburban sidewalk astronomy events to allow passers-by to experience astronomy. Needs 2-3 people for each event, and to schedule events. We are looking for volunteers who could do a series of Sidewalk Astronomy sessions this spring and summer, at a local park or public venue. For safety, moral support, and effectiveness, this should be done in teams of at least two people with telescopes. Special events like eclipse or comets especially draw the interest of the public.

Other volunteers? Find a way to help and contribute. Come up with a new idea to promote the EAS and astronomy in your community.

International Space Station – Visible Seattle Passes

ISS Visibility – Heavens Above:
http://www.heavens-above.com/PassSummary.asp?lat=47.979&lng=-122.201&alt=0&loc=Everett&TZ=PST&satid=25544

[The EAS welcomes newsletter article contributions and submissions of all types from its members.]

In EAS StarGazer - "The Planetarium"

(for Mid-July to Mid-August 2010**)**

- By John W Goerger - pos1@earthlink.net

Well before it gets dark so one can check out the deepsky objects **Venus** at a -4.3 is over in the west after sunset! Get you 'scope tracking this jewel of the evening, but a warning; if there are any non-astronomers around, people who have never looked or owned a telescope and they look through your 'scope, chances are you will not be able to aim your 'scope at anything else in the early evening sky until Venus sets! On the 1st of August 2010, about 30 minutes after sunset, Venus is about 15 degrees above the western horizon. By the 19th, Venus will have increase in visual brightness to around a -4.5 and will be at its **GREATEST ELONGATION** (46 degrees) from the Sun, which is its greatest angle away from the sun: at most, Venus will never get more then 47degrees from the Sun. There have been fictional books and movies stating or showing; Venus being overhead at midnight or showing such a thing—which cannot happen, as mentioned beforehand, the maximum angle Venus can get from the sun, is no more than 47 degrees! If Venus were; "overhead at midnight" it would mean that Venus would be at least 90 degrees from the Sun!

Mercury, the "winged messenger" glitters at a -0.5 in the middle of July and a visual +1.0 toward the end of July, 2010. Near the 26th of July, Mercury will be no more than 7 degrees above the west-northwestern horizon, which happens, 30 minutes after sunset. Try locating Mercury as soon as you can, given its low altitude but it decreases in visual brightness. Using binoculars is always a good item to have to scan for little Mercury but to real "see" what this "speed demon" looks like (takes about only 88 earth days to race around the sun), check out the articles being written about it, in recent science publications and on the internet. At the end of July 2010, its brightness will be about ½ (0.7 midway into August) what it nearly was half way through July, and also its diameter will be only 6.8 arc seconds (6.8) ---that is small. During the first part of August 2010, use binoculars, starting with the lower right of Venus, about two fists-widths to locate the feeble "dim witted" (that's mean) Mercury . My sources say on the 6th of August, it will be about 27 degrees from the Sun which is its Greatest Elongation from the sun, this year.

Saturn is still over in the west at sunset at a visual 1.1 with **Mars** still hanging around as well, at a visual 1.4 during the latter part of July. By the 1st of August Saturn is just 2 degrees to the upper right of Mars and in turn they are about 7 degrees to the upper left of Venus, with Mars at a visual 1.5 and Saturn 1.1. With Mars it will have an orange-reddish glow and Saturn a yellow or butterscotch color. Do your telescope observations of these planets early, as they are somewhat low in the atmosphere and if you wait and do your telescope viewing of them, you will be disappointed. The lower they are in the evening sky, the more

atmosphere you have to look though which in turn will cause more "twinkling" effect of the planets---a blurring if you will, of the objects.

Jupiter is the next brightest star-like object you will see, but after midnight! It shines at a visual 2.6 and way cool to observe though your telescope, about 2 hrs after it has risen over in the eastern part of the sky. It diameter will increase from the present 41.5 arc seconds (41.5") to 45.6 (45.6") arc seconds at the end of July. By August, Jupiter along with **Uranus** will rise a little bit after 10 PM local (Daylight Savings) with Jupiter brilliance at a -2.8 at a diameter of 48 arc seconds (48") and by mid-month it will increase another 2 arc seconds! Uranus is at a visual 5.8 and if you have 20/20 vision and in a dark site, you should be able to see it visually, without optical aid (remember planets do not "twinkle" as stars do). Uranus on the 1st of August is about 3 degrees west of Jupiter but the angular distance between them is closing! Around Mid-August there will be star, which glows a bit fainter then Uranus and will be halfway between Uranus and Jupiter. Uranus has a diameter of around 3.7 arc seconds (3.7") and has a blue-green color!

Comet 10P/Tempel might become a bit more visible on the 19/20 of July with astronomers expecting it to peak around 8th (visual) magnitude and possibility even brighter. According to my sources, it earned its designation because it was the "10th comet astronomers recognized as periodic" (ASTRONOMY JLY 2010 PG 42). A German-born astronomer, Ernst Wilhelm Tempel was the first person to discover this comet in 1873, and he relocated it on its return in the year 1878. Then there is Ceres**,** a rather large asteroid which at around 600 miles in diameter, is a good size rock! It will be around 8.1 to 8.6 visual and consult ASTRONOMY AUGUST 2010, PG 43 for detailed info on it and where to aim your telescope and stare at it!

My wife and had I had to make a run to Mesa AZ to check on my mom, she will be 99 this coming August 2nd. Given my wife's time she could take off from work, the latter part of June and the first week and half of July was the time period we could spare to check with mom. I will say, it was hot in Arizona, the sky was nice to look at, but hot at night as well. Anyway the reason I am mentioning this is because of this trip, my column this time will be somewhat shorter, but I promise to give it my best shot next month to write so much as your eyes will water and you will say, "enough is enough"! However there are a few topics I want to write about and will go into more detail into them in my next column.

There are quite a few articles showing up discussing the possibility of life on Mars and how come we haven't yet detected radio signals from those other intelligent civilizations the late Dr. Carl Sagan and other astronomers have written and talked about? Well I suspect one of the main reasons is; given what has been written concerning their "search programs", the astronomers have not been following the axiom KISS---*Keep it Simple Stupid*. They have been targeting other stars then just our type. The funding for checking out the cosmos for "intelligent radio transmissions" is limited and one cannot just think; "well, let's just check out all sorts of stars". First off, just because a star out there might be the same COLOR and MASS of our sun does not make it a good candidate for having a planet like our Earth in orbit about such a star.

You have to make sure the star has the "heavy elements" as our sun has----the first stars to form had **Hydrogen** and some **Helium** but none of the heavy elements we are so fond off (**Carbon, Nitrogen, Sodium, Uranium** to name just a few). Without the heavy elements planets like earth would not exist and life would not exist---life needs ***CARBON***; Hydrogen and Helium do not make very good complex chain molecules! Also, I have read what astronomers have been saying how they need to "think out of the box" and then mention "**Silicon**". Silicon, are they NUTS? Anyone who has taken ASTRONOMY 101 should have learned that there are lots of CARBON floating in space, but the amount of Silicon, very little compared to the massive volumes of CARBON! Also, as we all know there was only one life-form ever discovered in ***STAR TREK*** the TV series, which was composed of SILICON—the **HORTA**! Except for her children she that she was caring for, that was the only time SILICON based life-forms were discovered by the crew of the U.S.S. ENTERPRISE (not counting the Silicon-based actors that showed up on the series or the Silicon types that live in the Hollywood CA area).

If you think I might be jumping the gun here, check out the life-forms here on Earth---guess what, they are all CARBON UNITS (do not worry NOMAD is nowhere to be found, Captain Kirk took care of NOMAD, as well as Ve'Ger). Just like what the stars are made out of; **Hydrogen** is the FIRST element that is what the Universe uses to start a star. The same for life, if it is out there, somewhere---the most extensive and abundant element for making life is CARBON! Other problems abound and that is the term "**LIFE**". Given the material that is being written and spoken by some scientists they are mixing the term "LIFE" with something that can build radio telescopes and TV Shows. There is a BIG DIFFERENCE between something you could see using a microscope and life-forms building radio telescopes, writing TV shows and building TV sets! Even if "life" (the kind you see when you look though that microscope) is detected on Mars, how will we know that its "origins" were from Mars, or did impacts from asteroids and comets on Earth, transfer earth life on Mars, or maybe the reverse happened----impacts hit Mars and transferred the building materials of life (Carbon-based) from Mars to Earth?

Then there is the "building materials"---what were their "starting point(s)" or origin? Maybe they formed within comets and asteroids or maybe the precursors to them formed within the stellar clouds that were forming the proto-stars. The other major problem is with the **DRAKE EQUATION**---depending who is working it, there are lots of different ways to set-up the data to get the result a researcher wants, and that is not the way western science works. The DRAKE EQUATION is a starting point, but at present, it does not look like it can give a result that is independent of the researcher's wishes. From a conservative science viewpoint there might be no more than 1,000 civilizations with the ability to send and receive radio transmissions within our galaxy, at best----and even this number is probably way too high! If we did get a signal from another civilization and probably that civilization is located on the other side of the Milky Way Galaxy that means that signal was sent 100,000-400,000 light years ago (depends on the "DIAMETER OF THE GALAXY). It would then take (assuming we immediately understood the transmission and message and replied as soon as we received it) our signal take just as long to travel to the other side of our galaxy to the home world of those that had sent the message we had detected!

As far as "LIFE" existing in our galaxy, of course there is---it is just a matter of time, for the chemistry to happen and somewhere a carbon-based unit will find itself swimming around----but that does not mean it is "intelligent"---there are planets, there may be planets like Earth but with a civilization like that of the Roman Empire, the Mayans or OGG and ZOG the cave-folks---but again they would not have any technology which would allow them to send a signal to us or for us to send a signal to them----TO BE CONTINUED---also the unbelievable orders coming from the White House ordering NASA, as one of its major missions, to work with Muslims and space! Guess somewhat forgot at NASA, that during the heydays of Space Shuttle operations, people from the Middle East had been taken onboard the Space Shuttles as researchers-

--For those that still may not have read or heard, Neil Armstrong, the First Person to walk and explore the Moon (this last July 20th, 2010), was the 41st Anniversary of the First Human Landing on the Moon--- Apollo 11 and what have we done with that? NOTHING! The last human-rated mission to the moon was Apollo 17, landing on the moon in 1972 (December 11th) in the Lunar Module *Challenger* with Eugene Cernan being the last human being (THINK: living organism, to be on the moon) to leave the last American boot-print on the moon, are not at all pleased with the destruction of America's ability to send Americans into space or the cancellation of returning to the Moon; as I had written --- TO BE CONTINUED!

- *John Goerger*

ASTRONOMICAL NOTES -- ON & OFF THE WEB...

HYPERFAST STAR WAS BOOTED FROM MILKY WAY

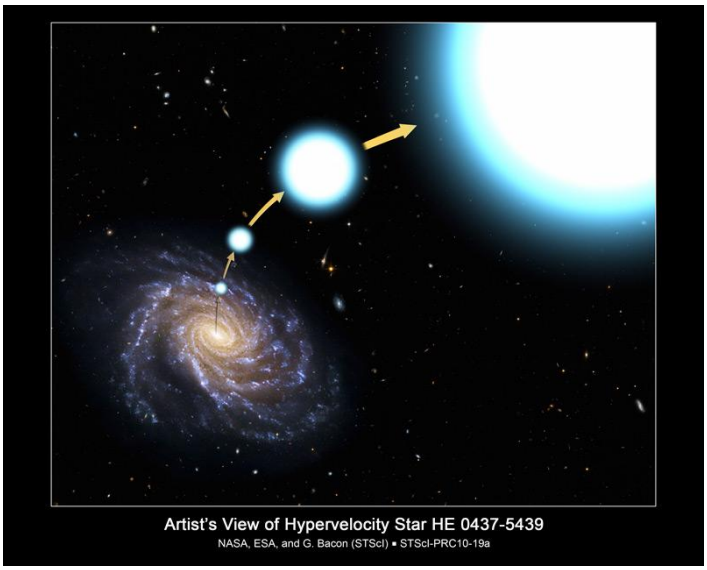
Hubble Space Telescope has detected a hypervelocity star, a rare phenomenon moving three times faster than our sun. The star may have been created in a cosmic misstep. A hundred million years ago, a triple-star system was traveling through the bustling center of our Milky Way galaxy when it wandered too close to the galaxy's giant black hole. The black hole captured one of the stars and hurled the other two out of the Milky Way. The two outbound stars merged to form a super-hot blue star traveling at incredible speeds. This story may seem like science fiction, but Hubble astronomers say it is the most likely scenario for the creation of a so-called hypervelocity star, known as HE 0437-5439. It is one of the fastest ever detected with a speed of 1.6 million mph. Hubble observations confirm that the stellar speedster hails from the Milky Way's core, settling some confusion about the star's original home.

Most of the roughly 16 known hypervelocity stars, all discovered since 2005, are thought to be exiles from the heart of our galaxy. But this Hubble result is the first direct observation linking such a star to an origin in the center of the galaxy. "*Using Hubble, we can for the first time trace back to where the star came from by measuring the star's direction of motion on the sky*," said astronomer Warren Brown. "*Our measurements point directly to the Milky Way center*."

Brown, a member of the Hubble team that observed the star, is the lead author on a paper about the finding. Brown said, "*These exiled stars are rare in the Milky Way's population of 100 billion stars. For every 100 million stars in the galaxy, there lurks one hypervelocity star*." The stellar outcast already is cruising in the Milky Way's distant outskirts about 200,000 light-years from the galaxy's center. Using Hubble to measure the runaway star's direction and determine the Milky Way's core as its starting point, Brown and Gnedin's team calculated how fast the star had to have been ejected to reach its current location. "*Studying these stars could provide more clues about the nature of some of the universe's unseen mass, and it could help astronomers better understand how galaxies form*," said team leader Oleg Gnedin.

The star's age is another mystery. Based on the speed and position of HE 0437-5439, the star would have to be 100 million years old to have journeyed from the Milky Way's core. Yet its mass -- nine times that of our sun-- and blue color mean that it should have burned out after only 20 million years -- far shorter than the transit time it took to get to its current location.

Astronomers have proposed two possibilities to solve the age problem. The star either dipped into the Fountain of Youth by becoming a blue straggler, or it was flung out of the Large Magellanic Cloud, a neighboring galaxy.



In this illustration, the hot, blue star HE 0437-5439 has been tossed out of the center of our Milky Way galaxy with enough speed to escape the galaxy's gravitational clutches. The stellar outcast is rocketing through the Milky Way's distant outskirts at 1.6 million miles an hour, high above the galaxy's disk, about 200,000 light-years from the center. The star is destined to roam intergalactic space. Credit: NASA, ESA, and G. Bacon (STScI)

In 2008 a team of astronomers thought they had solved the mystery. They found a match between the exiled star's chemical makeup and the characteristics of stars in the Large Magellanic Cloud. The rogue star's position also is close to the neighboring galaxy, only 65,000 light-years away. The new Hubble result, however, settles the debate over the star's birthplace and places it in the Milky Way.

The most likely explanation for the star's blue color and extreme speed is that it was part of a triple-star system that was involved in a gravitational billiards game with the galaxy's monster black hole. This concept for imparting an escape velocity on stars was first proposed in 1988. The theory predicted the Milky Way's black hole should eject a star about once every 100,000 years.

The triple-star system contained a pair of closely orbiting stars and a third outer member also gravitationally tied to the group. The black hole pulled the outer star away from the tight binary system. The doomed star's momentum was transferred to the stellar twosome, boosting the duo to escape velocity from the galaxy. As the pair rocketed away, they went on with normal stellar evolution. The more massive companion evolved more quickly, puffing up to become a red giant. It enveloped its partner, and the two stars spiraled together, merging into one superstar, the blue straggler that Hubble observed. A blue straggler is a relatively young, massive star produced by the merger of two lighter-weight stars.

Astronomers used the sharp vision of Hubble's Advanced Camera for Surveys to make two separate observations of the wayward star 3.5 years apart. Team member Jay Anderson developed a technique to measure the star's position relative to each of 11 distant background galaxies. These background galaxies form a reference frame in which Anderson compared the star's position in 2006 and 2009 to calculate how far it had moved. "*Hubble excels with this type of measurement*," Anderson said. "*This observation would be challenging to do from the ground*." The team is trying to determine the homes of four other unbound stars, all located on the fringes of the Milky Way. "*We are*

targeting massive "B" stars, like HE 0437-5439," said Brown, who has discovered 14 of the 16 known hypervelocity stars. "*These stars shouldn't live long enough to live in the distant outskirts of the Milky Way, so we shouldn't expect to find them there. But the quantity of stars in the outer region is much less than in the core, so we have a better chance of finding these unusual objects*." http://www.nasa.gov/hubble http://hubblesite.org/news/2010/19

SPITZER FINDS BUCKYBALLS IN SPACE FOR FIRST TIME

Astronomers using Spitzer Space Telescope have discovered carbon molecules, known as "buckyballs," in space for the first time. Buckyballs are soccer-ball-shaped molecules that were first observed in a laboratory 25 years ago. They are named for their resemblance to architect Buckminster Fuller's geodesic domes, which have interlocking circles on the surface of a partial sphere. Buckyballs were thought to float around in space, but had escaped detection until now. "*We found what are now the largest molecules known to exist in space*," said astronomer Jan Cami. "*We are particularly excited because they have unique properties that make them important players for all sorts of physical and chemical processes going on in space*." Cami has authored a paper about the discovery that will appear online in the journal Science.

Buckyballs are made of 60 carbon atoms arranged in three-dimensional, spherical structures. Their alternating patterns of hexagons and pentagons match a typical black-and-white soccer ball. The research team also found the more elongated relative of buckyballs, known as C70, for the first time in space. These molecules consist of 70 carbon atoms and are shaped more like an oval rugby ball. Both types of molecules belong to a class known officially as 'buckminsterfullerenes', or fullerenes.

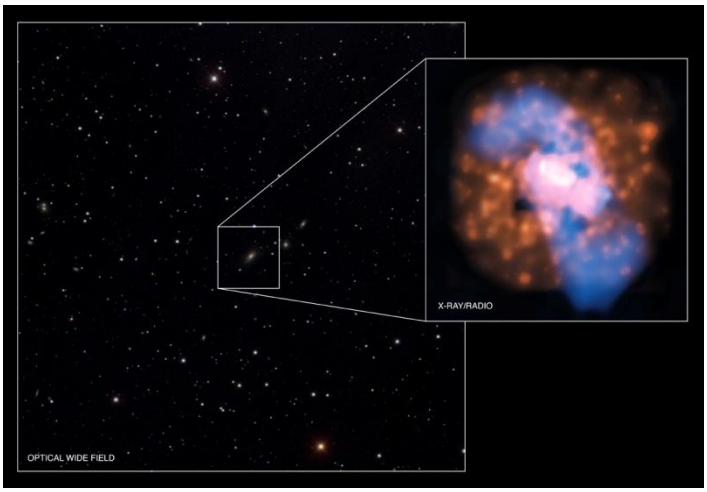
The Cami team unexpectedly found the carbon balls in a planetary nebula named Tc 1. Planetary nebulas are the remains of stars, like the sun, that shed their outer layers of gas and dust as they age. A compact, hot star, or white dwarf, at the center of the nebula illuminates and heats these clouds of material that has been shed. The buckyballs were found in these clouds, perhaps reflecting a short stage in the star's life, when it sloughs off a puff of material rich in carbon. The astronomers used Spitzer's spectroscopy instrument to analyze infrared light from the planetary nebula and see the spectral signatures of the buckyballs. These molecules are approximately room temperature -- the ideal temperature to give off distinct patterns of infrared light that Spitzer can detect. According to Cami, Spitzer looked at the right place at the right time. A century from now, the buckyballs might be too cool to be detected.

The data from Spitzer were compared with data from laboratory measurements of the same molecules and showed a perfect match. "*We did not plan for this discovery*," Cami said. "*But when we saw these whopping spectral signatures, we knew immediately that we were looking at one of the most sought-after molecules*." In 1970, Japanese professor Eiji Osawa predicted the existence of buckyballs, but they were not observed until lab experiments in 1985. Researchers simulated conditions in the atmospheres of aging, carbon-rich giant stars, in which chains of carbon had been detected. Surprisingly, these experiments resulted in the formation of large quantities of buckminsterfullerenes. The molecules have since been found on Earth in candle soot, layers of rock and meteorites. The study of fullerenes and their relatives has grown into a busy field of research because of the molecules' unique strength and exceptional chemical and physical properties. Among the potential applications are armor, drug delivery and superconducting technologies. Sir Harry Kroto, who shared the 1996 Nobel Prize in chemistry with Bob Curl and Rick Smalley for the discovery of buckyballs, said, "*This most exciting breakthrough provides convincing evidence that the buckyball has, as I long suspected, existed since time immemorial in the dark recesses of our galaxy*."

Previous searches for buckyballs in space, in particular around carbon-rich stars, proved unsuccessful. A promising case for their presence in the tenuous clouds between the stars was presented 15 years ago, using observations at optical wavelengths. That finding is awaiting confirmation from laboratory data. More recently, another Spitzer team reported evidence for buckyballs in a different type of object, but the spectral signatures they observed were partly contaminated by other chemical substances. http://www.nasa.gov/spitzer The full version of this story with accompanying images is at: http://www.jpl.nasa.gov/news/news.cfm?release=2010-243&cid=release_2010-243

BLACK HOLE SPIN AXIS JERKED AROUND (TWICE)

Scientists have found evidence that a giant black hole has been jerked around twice, causing its spin axis to point in a different direction from before. This discovery, made with new data from Chandra X-ray Observatory, might explain several mysterious-looking objects found throughout the Universe. The axis of the spinning black hole is thought to have moved, but not the black hole itself, so this result differs from recently published work on recoiling black holes. "*We think this is the best evidence ever seen for a black hole having been jerked around like this*," said Edmund Hodges-Kluck. "*We're not exactly sure what caused this behavior, but it was probably triggered by a collision between two galaxies*." A team of astronomers used Chandra for a long observation of a galaxy known as 4C+00.58, which is located about 780 million light years from Earth. Like most galaxies, 4C+00.58 contains a supermassive black hole at its center, but this one is actively pulling in copious quantities of gas. Gas swirling toward the black hole forms a disk around the black hole. Twisted magnetic fields in the disk generate strong electromagnetic forces that propel some of the gas away from the disk at high speed, producing radio jets.



This image shows the effects of a giant black hole that has been flipped around twice, causing its spin axis to point in a different direction from before. The large optical image, from the Sloan Digital Sky Survey, is centered on a radio galaxy named 4C +00.58. The smaller image to the right shows a close-up view of this galaxy in X-rays (in gold) from the Chandra X-ray Observatory, and radio waves (in blue) from the Very Large Array. Credit: X-ray (NASA/CXC/UMD/Hodges-Kluck et al): Radio (NSF/NRAO/VLA/UMD/Hodges-Kluck et al); Optical (SDSS)

A radio image of this galaxy shows a bright pair of jets pointing from left to right and a fainter, more distant line of radio emission running in a different direction. More specifically, 4C+00.58 belongs to a class of

"X-shaped" galaxies, so called because of the outline of their radio emission.

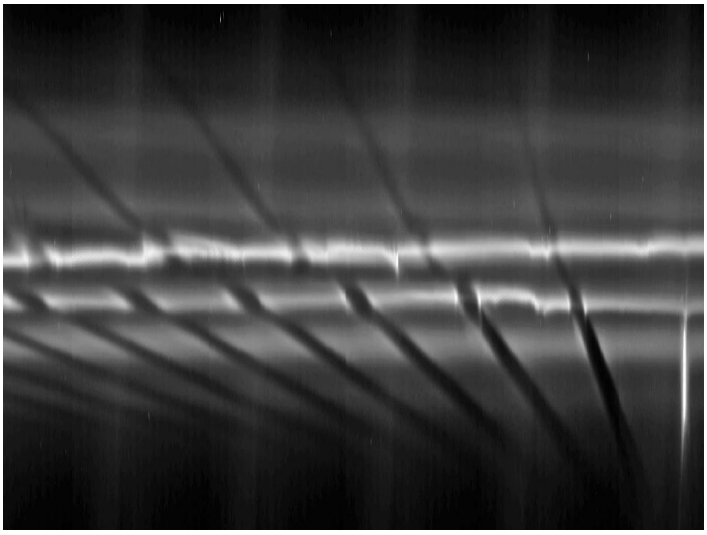
The new Chandra data have allowed astronomers to determine what may be happening in this system, and perhaps in others like it. The X-ray image reveals four different cavities around the black hole. These cavities come in pairs: one in the top-right and bottom-left, and another in the top-left and bottom-right. When combined with the orientation of the radio jets, the complicated geometry revealed in the Chandra image may tell the story of what happened to this supermassive black hole and the galaxy it inhabits. "*We think that this black hole has quite a history*," said Christopher Reynolds. "*Not once, but twice, something has caused this black hole to change its spin axis*."

According to the scenario presented by Hodges-Kluck and his colleagues, the spin axis of the black hole ran along a diagonal line from top-right to bottom-left. After a collision with a smaller galaxy, a jet powered by the black hole ignited, blowing away gas to form cavities in the hot gas to the top-right and bottom-left. Since the gas falling onto the black hole was not aligned with the spin of the black hole, the spin axis of the black hole rapidly changed direction, and the jets then pointed in a roughly top-left to bottom-right direction, creating cavities in the hot gas and radio emission in this direction. Then, either a merging of the two central black holes from the colliding galaxies, or more gas falling onto the black hole caused the spin axis to jerk around to its present direction in roughly a left to right direction. These types of changes in the angle of the spin of a supermassive black hole have previously been suggested to explain X-shaped radio galaxies, but no convincing case has been made in any individual case. "*If we're right, our work shows that jets and cavities are like cosmic fossils that help trace the merger history of an active supermassive black hole and the galaxy it lives in*," said Hodges-Kluck. "*If even a fraction of X-shaped radio galaxies are produced by such "spin-flips", then their frequency may be important for estimating the detection rates with gravitational radiation missions*." http://chandra.harvard.edu and http://chandra.nasa.gov

CASSINI SEES MOON BUILDING GIANT SNOWBALLS IN RING

While orbiting Saturn for the last six years, Cassini spacecraft has kept a close eye on the collisions and disturbances in the gas giant's rings. They provide the only nearby natural laboratory for scientists to see the processes that must have occurred in our early solar system, as planets and moons coalesced out of disks of debris. New images from Cassini show icy particles in Saturn's F ring clumping into giant snowballs as the moon Prometheus makes multiple swings by the ring. The gravitational pull of the moon sloshes ring material around, creating wake channels that trigger the formation of objects as large as 20 kilometers (12 miles) in diameter. "*Scientists have never seen objects actually form before*," said Carl Murray, a Cassini imaging team member. "*We now have direct evidence of that process and the rowdy dance between the moons and bits of space debris*." A new animation based on imaging data shows how one of the moons interacts with the F ring and creates dense, sticky areas of ring material. Saturn's thin, kinky F ring was discovered by Pioneer 11 spacecraft in 1979. Prometheus and Pandora, the small "shepherding" moons on either side of the F ring, were discovered a year later by Voyager 1. In the years since, the F ring has rarely looked the same twice, and scientists have been watching the impish behavior of the two shepherding moons for clues. Prometheus, the larger and closer to Saturn of the two moons, appears to be the primary source of the disturbances. At its longest, the potato-shaped moon is 148 kilometers (92 miles) across. It cruises around Saturn at a speed slightly greater than the speed of the much smaller F ring particles, but in an orbit that is just offset. As a result of its faster motion, Prometheus laps the F ring particles and stirs up particles in the same segment once in about every 68 days. "*Some of these objects will get ripped apart the next time Prometheus whips around*," Murray said. "*But some escape. Every time they survive an encounter, they can grow and become more and more stable*."

Cassini scientists using the ultraviolet imaging spectrograph previously detected thickened blobs near the F ring by noting when starlight was partially blocked. These objects may be related to the clumps seen by Murray and colleagues. The newly-found F ring objects appear dense enough to have what scientists call "self-gravity." That means they can attract more particles to themselves and snowball in size as ring particles bounce around in Prometheus's wake, Murray said. The objects could be about as dense as Prometheus, though only about one-fourteenth as dense as Earth.



Multiple F-Ring 'Fans'. This mosaic of images from NASA's Cassini spacecraft shows three fan-like structures in Saturn's tenuous F ring. Such "fans" suggest the existence of additional objects in the F ring. From right to left in the mosaic, each fan appears dark above the bright core of the F ring near the larger, diagonal channels created by the ring's shepherding moon Prometheus. The fans (marked "F" in the annotated version) can be seen developing as a series of channels within the F ring's particles. They appear to have a common origin but spread outward radially in different directions. Gravitational perturbations on ring material by a moonlet or clump of material can create these fans. The moonlet or clump orbits more or less elliptically compared to the rest of the F ring. It is probably embedded in the ring and causing the base of the fan channels to meet.

What gives the F ring snowballs a particularly good chance of survival is their special location in the Saturn system. The F ring resides at a balancing point between the tidal force of Saturn trying to break objects apart and self-gravity pulling objects together. One current theory suggests that the F ring may be only a million years old, but gets replenished every few million years by moonlets drifting outward from the main rings. However, the giant snowballs that form and break up probably have lifetimes of only a few months.

The new findings could also help explain the origin of a mysterious object about 5 to 10 kilometers (3 to 6 miles) in diameter that Cassini scientists spotted in 2004 and have provisionally dubbed S/2004 S 6. This object occasionally bumps into the F ring and produces jets of debris. "*The new analysis fills in some blanks in our solar system's history, giving us clues about how it transformed from floating bits of dust to dense bodies*," said Linda Spilker, Cassini project scientist. "*The F ring peels back some of the mystery and continues to surprise us*."

The late Kevin Beurle was made the honorary first author on this paper because of his contributions in developing software and designing observation sequences for this research. He died in 2009. http://www.nasa.gov/cassini and http://saturn.jpl.nasa.gov http://www.jpl.nasa.gov/news/news.cfm?release=2010-240&cid=release_2010-240

HUBBLE SNAPS SHARP IMAGE OF COSMIC CONCOCTION

A colorful star-forming region is featured in this stunning new Hubble Space Telescope image of NGC 2467. Looking like a roiling cauldron of some exotic cosmic brew, huge clouds of gas and dust are sprinkled with bright blue hot young stars.

Hubble/ACS image of NGC 2467. A colorful star-forming region is featured in this stunning new NASA/ESA Hubble Space Telescope image of NGC 2467. Looking like a roiling cauldron of some exotic cosmic brew, huge clouds of gas and dust are sprinkled with bright blue, hot young stars. Strangely shaped dust clouds, resembling spilled liquids, are silhouetted against a colorful background of glowing gas. Like the familiar Orion Nebula, NGC 2467 is a huge cloud of gas - mostly hydrogen - that serves as an incubator for new stars. This picture was created from images taken with the Wide Field Channel of the Advanced Camera for Surveys through three different filters (F550M, F660N and F658N, shown in blue, green and red respectively). These filters were selected to let through different colors of red and yellow light arising from different elements in the gas. The total aggregate exposure time was about 2000 seconds and the field of view is about 3.5 arcminutes across. These data were taken in 2004. Image credit: NASA, ESA and Orsola De Marco (Macquarie University)

The star-forming region NGC 2467 is a vast cloud of gas - mostly hydrogen - that serves as an incubator for new stars. Some of these youthful stars have emerged from the dense clouds where they were born and now shine brightly, hot and blue in this picture, but many others remain hidden.

The full beauty of this object and hints of the astrophysical processes at work within it are revealed in this super-sharp image from Hubble. Hot young stars that recently formed from the cloud are emitting fierce ultraviolet radiation that is causing the whole scene to glow while also sculpting the environment and gradually eroding the gas clouds. Studies have shown that most of the radiation comes from the single hot and brilliant massive star just above the centre of the image. Its fierce radiation has cleared the surrounding region and some of the next generation of stars are forming in the denser regions around the edge. One of the most familiar star-forming regions is the Orion Nebula, which can be seen with the naked eye. NGC 2467 is a similar but more distant example. Such stellar nurseries can be seen out to considerable distances in the Universe, and their study is important in determining the distance and chemical composition of other galaxies. Some galaxies contain huge star-forming regions, which may contain tens of thousands of stars. Another dramatic example is the 30 Doradus region in the Large Magellanic Cloud. NGC 2467 was discovered in the nineteenth century and lies in the southern constellation of Puppis, which represents the poop deck of Jason's fabled ship Argo from Greek mythology. NGC 2467 is thought to lie about 13 000 light-years from Earth. The picture was created from images taken with the Wide Field Channel of the Advanced Camera for Surveys through three different filters (F550M, F660N and F658N, shown in blue, green and red respectively). These data were taken in 2004.

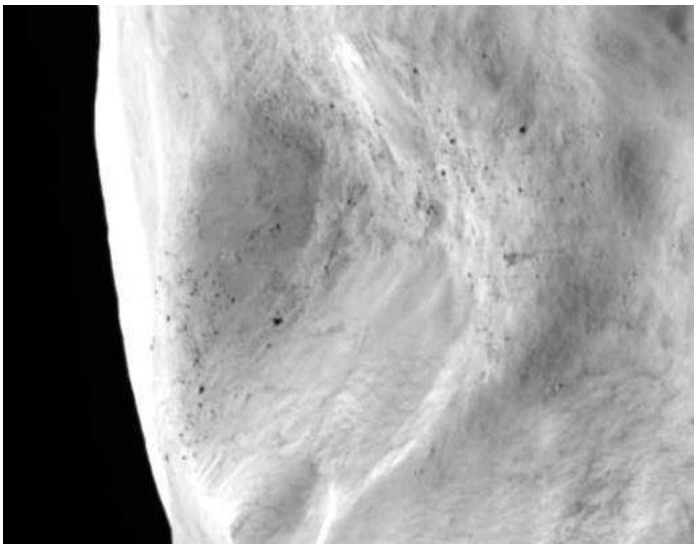
ROSETTA FLYBY OF ASTEROID (21) LUTETIA

On 10 July 2010 (DOY 191) at 15:44:57 UTC, Rosetta successfully flew past asteroid (21) Lutetia at a distance of 3160 km and with a relative speed of 15 km/s. The spectacular flyby manoeuver was conducted as planned with the spacecraft autonomously tracking the asteroid. The spacecraft has beamed back close-up photographs of asteroid Lutetia, an ancient, cratered relic from the dawn of the solar system. Scientists are abuzz about the stunning images, which reveal a worldlet of haunting, alien beauty. "*I've never seen anything like it*," says Claudia Alexander, project scientist for the U.S. Rosetta Project. "*It looked as though it could have been fractured off of a mother asteroid – it was all angles and flat planes, ancient impacts overlaid by newer ones, covered by dust of some kind*."

Some observers are calling this the "Alfred Hitchcock" shot. Rosetta took the picture as it was receding from Lutetia on July 10th. Credit: ESA

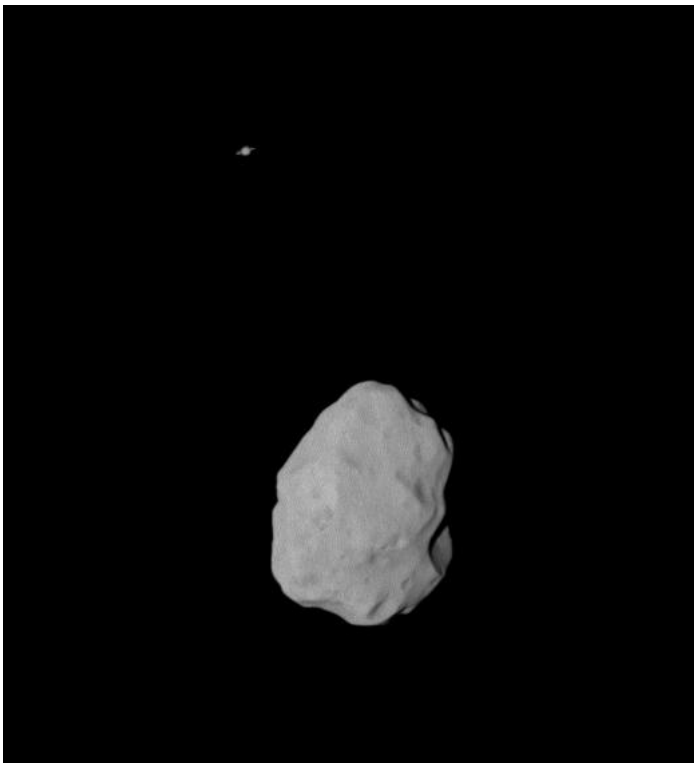
She is particularly intrigued by a giant dent in the asteroid's side. "*My first guess would be that it's the remnant of a giant collision that occurred sometime in the distant past*," says Alexander. "*The edges look shallow rather than sharp and deep as might be the case with a fresh crater. I'm sure there will be much more analysis of that feature in the*

weeks to come." And then there's the perplexing appearance that boulders rolled down Lutetian slopes at some point. "*If that is indeed what we're seeing, the question becomes 'what could have caused the rolling? Perhaps the asteroid spun-up, spun-down, or experienced some orbital irregularity. It's not clear right now that the asteroid is subject to the forces that could cause these things. This is another issue for further study*."



A possible landslide and boulders on asteroid Lutetia. Credit ESA.

"*Right now we have more questions than answers*," Alexander continues. "*We can only speculate at this point about what we're seeing in the pictures*."



Lutetia and Saturn. Credit: ESA

Asteroid Lutetia has been a target of interest among astronomers for many years. It is one of the largest asteroids in the solar system and has a strange spectrum of reflected light that doesn't look quite like any other asteroid. When the opportunity presented itself for Rosetta to pay a visit en route to its prime target, comet 67P/Churyumov-Gerasimenko in 2014, mission planners couldn't pass it up. Now that Alexander has seen the images, she can't help but wonder what it would be like to have a walk around. "*Astronauts would have a hard time walking on Lutetia -- the gravity is likely to be much less than that of the moon*," she says. "*Also, the surface regolith looks very powdery, so astronauts might find themselves sinking in maybe a half-inch or so as they walked*."

The MIRO (Microwave Instrument for the Rosetta Orbiter) instrument will help determine whether the surface layers are powdery or rocky. As scientists analyze data from Rosetta's other instruments, they'll be able to determine Lutetia's mass and density, thus revealing more about the asteroid's composition and helping solve the riddle of its origin. Is Lutetia a 130-km fragment from a planet that broke apart billions of years ago? Or is it one of the original planetary building blocks astronomers call "planetesimals" that has remained the same because no planet sucked it in during the solar system's formative years? As scientists begin to answer these questions with the Rosetta data, they'll gain new insights into the origin and history of asteroids, and also learn more about the evolution of the solar system itself. An asteroid's contents can reveal something about the conditions and makeup of the solar nebula where the asteroid formed. "*Rosetta took measurements with 17 different instruments*," says Rita Schulz, ESA Project Scientist for the Rosetta Mission. "*When all the data are analyzed, Lutetia will be one of the best known asteroids out there." "These spectacular images," she says, "are just the beginning*."

A large subset of the payload complement was activated for scientific operations and unique images of Lutetia were released within hours after acquisition and posted on the ESA web pages.

SUPER-HOT PLANET WITH UNIQUE COMET-LIKE TAIL

Astronomers using Hubble Space Telescope have confirmed the existence of a baked object that could be called a "cometary planet." The gas giant planet, named HD 209458b, is orbiting so close to its star that its heated atmosphere is escaping into space. Observations taken with Hubble's Cosmic Origins Spectrograph (COS) suggest powerful stellar winds are sweeping the cast-off atmospheric material behind

the scorched planet and shaping it into a comet-like tail. "*Since 2003 scientists have theorized the lost mass is being pushed back into a tail, and they have even calculated what it looks like*," said astronomer Jeffrey Linsky, leader of the COS study. "*We think we have the best observational evidence to support that theory. We have measured gas coming off the planet at specific speeds, some coming toward Earth. The most likely interpretation is that we have measured the velocity of material in a tail*."

The planet, located 153 light years from Earth, weighs slightly less than Jupiter but orbits 100 times closer to its star than the Jovian giant. The roasted planet zips around its star in a short 3.5 days. In contrast, our solar system's fastest planet, Mercury, orbits the sun in 88 days. The extrasolar planet is one of the most intensely scrutinized, because it is the first of the few known alien worlds that can be seen passing in front of, or transiting, its star. Linsky and his team used COS to analyze the planet's atmosphere during transiting events. During a transit, astronomers study the structure and chemical makeup of a planet's atmosphere by sampling the starlight that passes through it. The dip in starlight because of the planet's passage, excluding the atmosphere, is very small, only about 1.5 percent. When the atmosphere is added, the dip jumps to 8 percent, indicating a bloated atmosphere.

COS detected the heavy elements carbon and silicon in the planet's super-hot 2,000 degrees Fahrenheit atmosphere. This detection revealed the parent star is heating the entire atmosphere, dredging up the heavier elements and allowing them to escape the planet. The COS data also showed the material leaving the planet was not all traveling at the same speed. "*We found gas escaping at high velocities, with a large amount of this gas flowing toward us at 22,000 miles per hour*," Linsky said. "*This large gas flow is likely gas swept up by the stellar wind to form the comet-like tail trailing the planet*."

This artist's illustration shows a view of the gas giant planet HD 209458b, as seen from the surface of a hypothetical nearby companion object. The planet is orbiting so close to its sunlike star that its heated atmosphere is escaping into space. Spectroscopic observations by the new Cosmic Origins Spectrograph (COS) aboard the Hubble Space Telescope suggest that powerful stellar winds are sweeping the castoff material behind the scorched planet and shaping it into a comet-like tail. Art Credit: NASA, ESA, and G. Bacon (STScI) Science Credit: J. Linsky (University of Colorado, Boulder, Colo.)

Hubble's newest spectrograph has the ability to probe a planet's chemistry at ultraviolet wavelengths not accessible to ground-based telescopes. COS is proving to be an important instrument for probing the atmospheres of "hot Jupiters" like HD 209458b.

Another Hubble instrument, the Space Telescope Imaging Spectrograph (STIS), observed the planet in 2003. The STIS data showed an active, evaporating atmosphere, and a comet-tail-like structure was suggested as a possibility. But STIS wasn't able to obtain the spectroscopic detail necessary to show a tail, or an Earthward-moving component of the gas, during transits. The tail was detected for the first time because of the unique combination of very high ultraviolet sensitivity and good spectral resolution provided by COS. Although this extreme planet is being roasted by its star, it won't be destroyed anytime soon. "*It will take about a trillion years for the planet to evaporate*," Linsky said. http://www.nasa.gov/hubble

See Beautiful Ontario Lacus: Cassini's Guided Tour

Ontario Lacus, the largest lake in the southern hemisphere of Saturn's moon Titan, turns out to be a perfect exotic vacation spot, provided you can handle the frosty, subzero temperatures and enjoy soaking in liquid hydrocarbon. Scientists working with Cassini spacecraft describe evidence of beaches for sunbathing in Titan's low light, sheltered bays for mooring boats, and pretty deltas for wading out in the shallows. They also describe seasonal changes in the lake's size and depth, giving vacationers an opportunity to visit over and over without seeing the same lake twice. (Travel agents, of course, will have to help you figure out how to breathe in an atmosphere devoid of oxygen.)

Using data that give us the most detailed picture yet of a lake on another world, scientists and animators have collaborated on a new video tour of Ontario Lacus based on radar data from Cassini's Titan flybys on June 22, 2009, July 8, 2009, and Jan. 12, 2010. A Web video explaining how scientists look to Earth's Death Valley to understand places like Titan's Ontario Lacus is available at: http://www.jpl.nasa.gov/video/index.cfm?id=913 .

"*With such frigid temperatures and meager sunlight, you wouldn't think Titan has a lot in common with our own Earth*," said Steve Wall, deputy team lead for the Cassini radar team. "*But Titan continues to surprise us with activity and seasonal processes that look marvelously, eerily familiar*." Cassini arrived at Saturn in 2004 when the southern hemisphere of the planet and its moons were experiencing summer. The seasons have started to change toward autumn, with winter solstice darkening the southern hemisphere of Titan in 2017. A year on Titan is the equivalent of about 29 Earth years.

Titan is the only other world in our solar system known to have standing bodies of liquid on its surface. Because surface temperatures at the poles average a chilly 90 Kelvin (about minus 300 degrees Fahrenheit), the liquid is a combination of methane, ethane and propane, rather than water. Ontario Lacus has a surface area of about 15,000 square kilometers (6,000 square miles), slightly smaller than its terrestrial namesake Lake Ontario.

Cassini first obtained an image of Ontario Lacus with its imaging camera in 2004. A paper submitted by Alex Hayes, a Cassini radar team member, and colleagues finds that the lake's shoreline has receded by about 10 kilometers (6 miles). This has resulted in a liquid level reduction of about 1 meter (3 feet) per year over a four-year period. The shoreline appears to be receding because of liquid methane evaporating from the lake, with a total amount of evaporation that would significantly exceed the yearly methane gas output of all the cows on Earth, Hayes said. Some of the liquid could also seep into porous ground material. Hayes said the changes in the lake are likely occurring as part of Titan's seasonal methane cycle, and would be expected to reverse during southern winter.

This seasonal filling and receding is similar to what occurs at the shallow lakebed known as Racetrack Playa in Death Valley National

Park, Hayes said. In fact, from the air, the topography and shape of Racetrack Playa and Ontario Lacus are quite similar, although Ontario Lacus is about 60 times larger. "*We are very excited about these results, because we did not expect Cassini to be able to detect changes of this magnitude in Titan's lakes*," Hayes said. "*It is only through the continued monitoring of seasonal variation during Cassini's extended mission that these discoveries have been made possible*."

Other parts of the Ontario Lacus' shoreline, as described in an earlier paper by Wall, Hayes and other colleagues, show flooded valleys and coasts, further proof that the lake level has changed. The delta revealed by Cassini radar data on the western shore of Ontario Lacus is also the first well-developed delta observed on Titan, Wall said. He explained that the shape of the land there shows liquid flowing down from a higher plain switching channels on its way into the lake, forming at least two lobes.

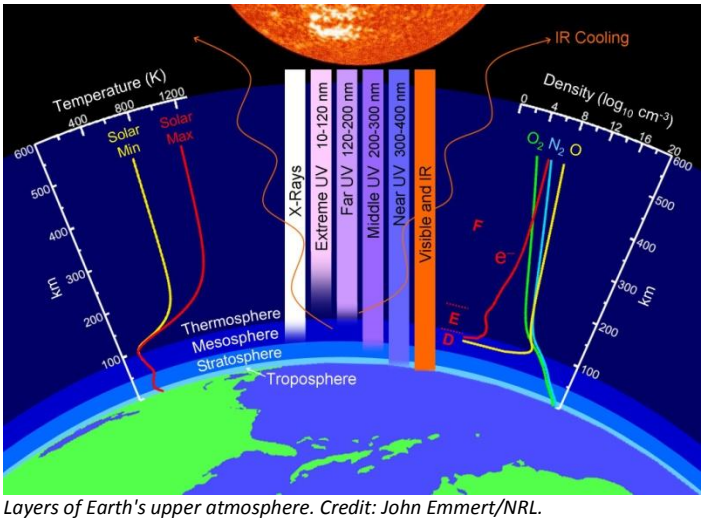
Examples of this kind of channel switching and wave-modified deltas can be found on Earth at the southern end of Lake Albert between Uganda and the Democratic Republic of Congo in Africa, and the remains of an ancient lake known as Megachad in the African country Chad, Wall said. The radar data also show a smooth beach on the northwestern shore of Ontario Lacus. Smooth lines parallel to the current shoreline could be formed by low waves over time, which were likely driven by winds sweeping in from the west or southwest. The pattern at Ontario Lacus resembles what might be seen on the southeastern side of Lake Michigan, where waves sculpt the shoreline in a similar fashion. "*Cassini continues to take our breath away as it fills in the details on the surfaces of these far-off moons*," said Linda Spilker, Cassini project scientist. "*It's exhilarating to ride along as it takes us on the ultimate cold-weather adventure*."

A Puzzling Collapse of Earth's Upper Atmosphere

Researchers are monitoring a big event in our planet's atmosphere. High above Earth's surface where the atmosphere meets space, a rarefied layer of gas called "the thermosphere" recently collapsed and now is rebounding again. "*This is the biggest contraction of the thermosphere in at least 43 years*," says John Emmert, lead author of a paper announcing the finding. "*It's a Space Age record*." The collapse happened during the deep solar minimum of 2008-2009—a fact which comes as little surprise to researchers. The thermosphere always cools and contracts when solar activity is low. In this case, however, the magnitude of the collapse was two to three times greater than low solar activity could explain. "*Something is going on that we do not understand*," says Emmert.

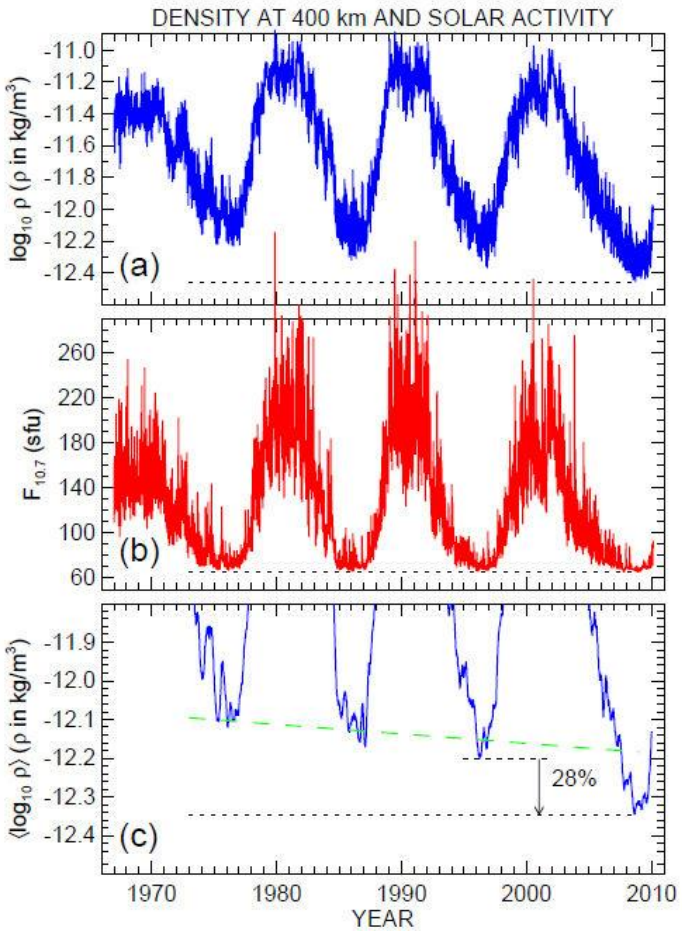
The thermosphere ranges in altitude from 90 km to 600+ km. It is a realm of meteors, auroras and satellites, which skim through the thermosphere as they circle Earth. It is also where solar radiation makes first contact with our planet. The thermosphere intercepts extreme ultraviolet (EUV) photons from the sun before they can reach the ground. When solar activity is high, solar EUV warms the thermosphere, causing it to puff up like a marshmallow held over a camp fire. (This heating can raise temperatures as high as 1400 K—hence the name thermosphere.) When solar activity is low, the opposite happens.

Lately, solar activity has been very low. In 2008 and 2009, the sun plunged into a century-class solar minimum. Sunspots were scarce, solar flares almost non-existent, and solar EUV radiation was at a low ebb. Researchers immediately turned their attention to the thermosphere to see what would happen.



Layers of Earth's upper atmosphere. Credit: John Emmert/NRL.

How do you know what's happening all the way up in the thermosphere? Emmert uses a clever technique: Because satellites feel aerodynamic drag when they move through the thermosphere, it is possible to monitor conditions there by watching satellites decay. He analyzed the decay rates of more than 5000 satellites ranging in altitude between 200 and 600 km and ranging in time between 1967 and 2010.



These plots show how the density of the thermosphere (at a height of 400 km) has waxed and waned during the past four solar cycles. Frames (a) and (c) are density; frame (b) is the sun's radio intensity at a wavelength of 10.7 cm, a key indicator of solar activity. Note the yellow circled region. In 2008 and 2009, the

density of the thermosphere was 28% lower than expectations set by previous solar minima. Credit: Emmert et al. (2010), Geophys. Res. Lett., 37, L12102.

This provided a unique space-time sampling of thermospheric density, temperature, and pressure covering almost the entire Space Age. In this way he discovered that the thermospheric collapse of 2008-2009 was not only bigger than any previous collapse, but also bigger than the sun alone could explain.

One possible explanation is carbon dioxide (CO2). An NCAR video shows how carbon dioxide warms the lower atmosphere, but cools the upper atmosphere. When carbon dioxide gets into the thermosphere, it acts as a coolant, shedding heat via infrared radiation. It is widely-known that CO2 levels have been increasing in Earth's atmosphere. Extra CO2 in the thermosphere could have magnified the cooling action of solar minimum.

"*But the numbers don't quite add up*," says Emmert. "*Even when we take CO2 into account using our best understanding of how it operates as a coolant, we cannot fully explain the thermosphere's collapse*." According to Emmert and colleagues, low solar EUV accounts for about 30% of the collapse. Extra CO2 accounts for at least another 10%. That leaves as much as 60% unaccounted for. The authors acknowledge that the situation is complicated. There's more to it than just solar EUV and terrestrial CO2. For instance, trends in global climate could alter the composition of the thermosphere, changing its thermal properties and the way it responds to external stimuli. The overall sensitivity of the thermosphere to solar radiation could actually be increasing. "*The density anomalies*," they wrote, "may signify that an as-yet-unidentified climatological tipping point *involving energy balance and chemistry feedbacks has been reached*." Or not.

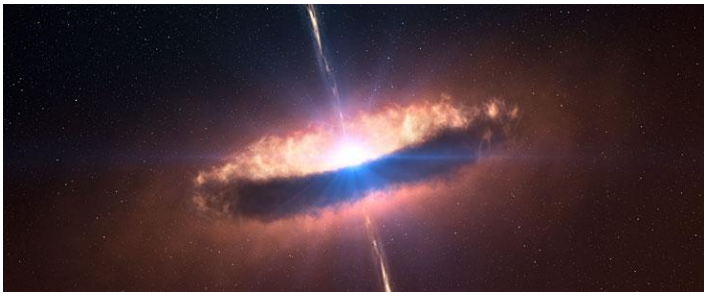
Important clues may be found in the way the thermosphere rebounds. Solar minimum is now coming to an end, EUV radiation is on the rise, and the thermosphere is puffing up again. Exactly how the recovery proceeds could unravel the contributions of solar vs. terrestrial sources. "*We will continue to monitor the situation*," says Emmert. - Author: Dr. Tony Phillips Credit: Science@NASA

MEET THE TITANS: DUST DISK FOUND AROUND MASSIVE STAR

A new discovery has the potential to answer the long-standing question of how massive stars are born -- and hints at the possibility that planets could form around the galaxy's biggest bodies. "*Astronomers have long been unclear about how the most massive stars form*," said Stefan Kraus. "*Because they tend to be at very large distances and surrounded by dusty envelopes, it's very hard to separate and closely observe them*." To get a better look, Kraus' team used the Very Large Telescope Interferometer of the European Southern Observatory in Chile to focus on IRAS 13481-6124, a star located at a distance of 10,000 light-years away in the constellation Centaurus, and about 20 times more massive than our sun. "*We were able to get a very sharp view into the innermost regions around this star by combining the light of separate telescopes*," Kraus said, "*basically mimicking the resolving power of a telescope with an incredible 85-meter [280-foot] mirror*."

The team's observations yielded a jackpot result: the discovery of a massive disk of dust and gas encircling the giant young star. "*It's the first time something like this has been observed*," Kraus said. "*The disk very much resembles what we see around young stars that are much smaller, except everything is scaled up and more massive*."

The presence of the disk is strong evidence that even the very largest stars in the galaxy form by the same process as smaller ones -- growing out of the dense accumulation of vast quantities of gas and dust, rather than the merging of smaller stars, as had been previously suggested by some scientists. The results were confirmed by Spitzer Space Telescope.



"*We looked at archival images of the star taken by Spitzer, and confirmed that the star is flinging disk material outward from its polar regions, just as we see with smaller stars and their dust disks*," Kraus said.

The discovery also opens up the possibility that planets, perhaps even Earth-like ones, may be able to form around massive stars like IRAS 13481-6124, in the same way that they formed around our sun when it was much younger. "*In the future, we might be able to see gaps in this and other dust disks created by orbiting planets, although it is unlikely that such bodies could survive for long*." Kraus said. "*A planet around such a massive star would be destroyed by the strong stellar winds and intense radiation as soon as the protective disk material is gone, which leaves little chance for the development of solar systems like our own*." Still, huge stars like IRAS 13481-6124 provide the building blocks for life to arise elsewhere in the universe. "*High-mass stars are where heavy elements necessary for life are created, so they are of major importance*," Kraus said "*This discovery is a clearer picture than we've had before and allows us to understand them better*."

Spitzer previously detected dusty disks of planetary debris around more mature massive stars, further supporting the notion that planets may form even in these extreme environments. The recent and previous Spitzer observations were made before the space telescope ran out of its liquid coolant in May 2009, officially beginning its warm mission. More information about that research is online at: http://www.spitzer.caltech.edu/news/230 . More information about NASA's planet-finding missions is online at http://planetquest.jpl.nasa.gov . Other images are available at http://www.eso.org/public/news/eso1029 .

MICROSOFT RESEARCH & NASA PROVIDE MARS 3-D CLOSE ENCOUNTER IN MICROSOFT'S WORLD WIDE TELESCOPE

Microsoft Research and NASA are bringing Mars to life with new features in the WorldWide Telescope (WWT) software that provides viewers with a high-resolution 3-D map of the Red Planet. WorldWide Telescope has created a Terapixel seamless spherical stich of the night sky the represents the largest, clearest, sharpest and most stunning view of the night sky available anywhere, in the 'WorldWide Telescope Apogee release, with Mars and the Terapixel Sky'. You can see spectacular images of surface features, and even rover tracks from Spirit and Opportunity. There are also spherical panoramas, and a huge catalog of craters, features, and other places of interest.

Microsoft's online virtual telescope explores the universe using images NASA spacecraft return from other worlds. Teams at Ames Research Center in Moffett Field, CA, and Microsoft in Redmond, WA, jointly developed the software necessary to make the planetary data available in WorldWide Telescope. "*By providing the Mars dataset to the public on the WorldWide Telescope platform, we are enabling a whole new audience to experience the thrill of space*," said Chris C. Kemp, chief technology officer for information technology.

The fully-interactive images and new NASA data will allow viewers to virtually explore Mars and make their own scientific discoveries. New features include the highest resolution fully interactive map of Mars ever created, realistic 3-D renderings of the surface of the planet and video tours, with two NASA scientists, James Garvin, and Carol Stoker. Garvin's tour walks viewers through the geological history of Mars and discusses three possible landing sites for human missions there. Each landing site highlights a different geological era of the planet. Stoker's tour addresses the question "Is there life on Mars?" and describes the findings of Mars Phoenix Lander. "*Our hope is that this inspires the next generation of explorers to continue the scientific discovery process*," said Ames Center Director S. Pete Worden.

The Intelligent Robotics Group at Ames Research Center developed open source software that runs on the NASA Nebula cloud computing platform to create and host the high resolution maps. The maps contain 74,000 images from Mars Global Surveyor's Mars Orbiter Camera and more than 13,000 high-resolution images of Mars taken by the Mars Reconnaissance Orbiter's High Resolution Imaging Science Experiment (HiRISE) camera. Each individual HiRISE image contains more than a billion pixels. The complete maps were rendered into image mosaics containing more than half a billion smaller images. "*These incredibly detailed maps will enable the public to better experience and explore Mars*," said Michael Broxton, a research scientist in the Intelligent Robotics Group. "*Microsoft has a long-standing relationship with NASA that has enabled us to jointly provide the public with the ability to discover space in a new way*," said Tony Hey, corporate vice president of the External Research Division of Microsoft Research.

To learn more, and download the WorldWide Telescope, visit: http://www.worldwidetelescope.org http://hirise.lpl.arizona.edu Press release: http://www.microsoft.com/Presspass/Features/2010/jul10/07-12WWT.mspx video: http://research.microsoft.com/en-us/events/fs2010/video_mars.aspx Story : http://research.microsoft.com/en-us/news/features/terapixel-071210.aspx Install it here: http://www.worldwidetelescope.org/Home.aspx

* The new Layer manager lets you add all sorts of your own data anywhere on Earth or in the universe, and then add and animate the data in your tours.
* Support 3ds Models. Let's you tell better stories with spacecraft, buildings, odd-shaped planetoids, etc. And animated.
* Cut & paste quick visualization from Excel -A very flexible and powerful feature lets you add animated, 3d pots anywhere and see them in 3d stereo.
* Image layers can be added to create new planets in orbit
* High-resolution Earth
* New Earth Elevation maps, and color imagery
* Ability to descend to human scale
* Plot data on, above or under Earth. True 3d data visualization you can't get anywhere else.
* See the complete 500,000+ objects tracked by the Minor Planet Center, updated in real-time in the GPU
* Speed up time and watch the dynamics of our Solar System with a half-a-million new moving objects

The new Terapixel Seamless Sky

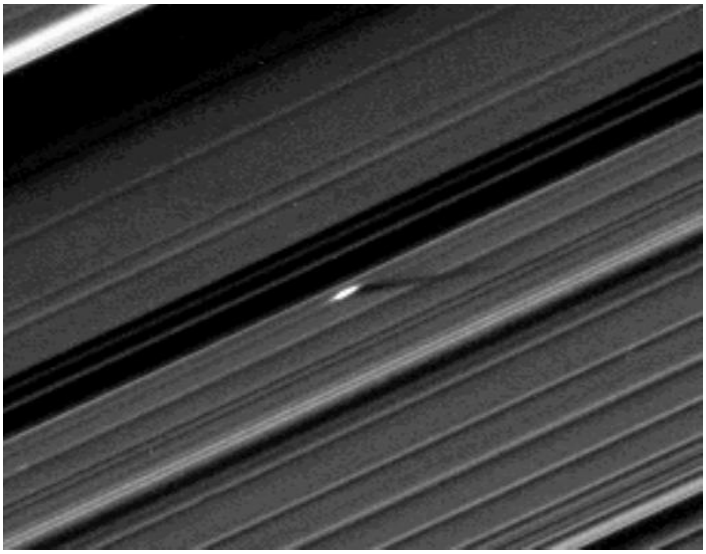
Saturn Propellers Reflect Solar System Origins

Scientists using Cassini spacecraft at Saturn have stalked a new class of moons in the rings of Saturn that create distinctive propeller-shaped gaps in ring material. It marks the first time scientists have been able to track the orbits of individual objects in a debris disk. The research gives scientists an opportunity to time-travel back into the history of our solar system to reveal clues about disks around other stars in our universe that are too far away to observe directly.

"*Observing the motions of these disk-embedded objects provides a rare opportunity to gauge how the planets grew from, and interacted with, the disk of material surrounding the early sun*," said Carolyn Porco, Cassini imaging team lead, and a co-author on the paper. "*It allows us a glimpse into how the solar system ended up looking the way it does*." Cassini scientists first discovered double-armed propeller features in 2006 in an area now known as the "propeller belts" in the middle of Saturn's outermost dense ring, known as the A ring. The spaces were created by a new class of moonlets - smaller than known moons, but larger than the particles in the rings - that could clear the space immediately around them. Those moonlets, which were estimated to number in the millions, were not large enough to clear out their entire path around Saturn, as do the moons Pan and Daphnis.

The new paper, led by Matthew Tiscareno, a Cassini imaging team associate, reports on a new cohort of larger and rarer moons in another part of the A ring farther out from Saturn. With propellers as much as hundreds of times as large as those previously described, these new objects have been tracked for as long as four years. The propeller features are up to several thousand kilometers (miles) long and several kilometers (miles) wide. The moons embedded in the ring appear to kick up ring material as high as 0.5 kilometers (1,600 feet) above and below the ring plane, which is well beyond the typical ring thickness of about 10 meters (30 feet). Cassini is too far away to see the moons amid the swirling ring material around them, but scientists estimate that they are about a kilometer (half a mile) in diameter because of the size of the propellers. Tiscareno and colleagues estimate that there are dozens of these giant propellers, and 11 of them were imaged multiple times between 2005 to 2009. One of them, nicknamed Bleriot after the famous aviator Louis Bleriot, has been a veritable Forrest

Gump, showing up in more than 100 separate Cassini images and one ultraviolet imaging spectrograph observation over this time. "*Scientists have never tracked disk-embedded objects anywhere in the universe before now*," Tiscareno said. "*All the moons and planets we knew about before orbit in empty space*".



An unusually large propeller feature is detected just beyond the Encke Gap in this Cassini image of Saturn's outer A ring taken a couple days after the planet's August 2009 equinox. The unique geometry of equinox has thrown into relief small moonlets within the rings and the structures they create around them. Propeller-like features, a few kilometers long, centered on and created by the action of small embedded moonlets only about 100 meters across, were discovered early in the mission. From the 350-kilometer (220-mile) length of the shadow cast by this 130-kilometer-long (80-mile-long) propeller, the heights of these features above the ring plane have been measured to reach about 200 meters (650 feet), indicating the moonlet responsible for the propeller in this image is likely to be 400 meters (1,300 feet) across

"*In the propeller belts, we saw a swarm in one image and then had no idea later on if we were seeing the same individual objects. With this new discovery, we can now track disk-embedded moons individually over many years*." Over the four years, the giant propellers have shifted their orbits, but scientists are not yet sure what is causing the disturbances in their travels around Saturn. Their path may be upset by bumping into other smaller ring particles, or responding to their gravity, but the gravitational attraction of large moons outside the rings may also be a factor. Scientists will continue monitoring the moons to see if the disk itself is driving the changes, similar to the interactions that occur in young solar systems. If it is, Tiscareno said, this would be the first time such a measurement has been made directly. "*Propellers give us unexpected insight into the larger objects in the rings*," said Linda Spilker, Cassini project scientist. "*Over the next seven years, Cassini will have the opportunity to watch the evolution of these objects and to figure out why their orbits are changing*." http://www.nasa.gov/cassini http://saturn.jpl.nasa.gov http://ciclops.org

STARBURST CLUSTER SHOWS CELESTIAL FIREWORKS

Like a July 4 fireworks display, a young, glittering collection of stars looks like an aerial burst. The cluster is surrounded by clouds of interstellar gas and dust—the raw material for new star formation. The nebula, located 20,000 light-years away in the constellation Carina, contains a central cluster of huge, hot stars, called NGC 3603. Star clusters like NGC 3603 provide important clues to understanding the origin of massive star formation in the early, distant universe. This Hubble Space Telescope image was captured in August 2009 and December 2009 with the Wide Field Camera 3 in both visible and infrared light, which trace the glow of sulfur, hydrogen, and iron.

Credit: NASA, ESA, R. O'Connell (University of Virginia), F. Paresce (National Institute for Astrophysics, Bologna, Italy), E. Young (Universities Space Research Association/Ames Research Center), the WFC3 Science Oversight Committee, and the Hubble Heritage Team (STScI/AURA)

This environment is not as peaceful as it looks. Ultraviolet radiation and violent stellar winds have blown out an enormous cavity in the gas and dust enveloping the cluster, providing an unobstructed view of the cluster. Most of the stars in the cluster were born around the same time but differ in size, mass, temperature, and color. The course of a star's life is determined by its mass, so a cluster of a given age will contain stars in various stages of their lives, giving an opportunity for detailed analyses of stellar life cycles. NGC 3603 also contains some of the most massive stars known. These huge stars live fast and die young, burning through their hydrogen fuel quickly and ultimately ending their lives in supernova explosions. Star clusters like NGC 3603 provide important clues to understanding the origin of massive star formation in the early, distant universe. Astronomers also use massive clusters to study distant starbursts that occur when galaxies collide, igniting a flurry of star formation. The proximity of NGC 3603 makes it an excellent lab for studying such distant and momentous events.

FROM THE EDITOR'S TERMINAL

The Stargazer is your newsletter and therefore it should be a cooperative project. Ads, announcements, suggestions, and literary works should be received by the editor at least two weeks prior to the next upcoming scheduled EAS meeting.

If you wish to contribute an article or suggestions to ***The Stargazer*** please contact Mark Folkerts by email or by telephone (425) 486-9733.

The Star Gazer
P.O. Box 12746
Everett, WA 98206

In July's StarGazer:

The next EAS Meeting is 3:00 pm, Saturday August 21st, at the Evergreen Branch Library.