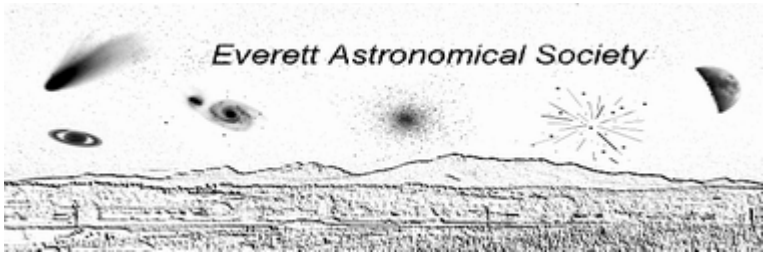
Volume MMVIII. No. 6



The Stargazer

June 2008

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		(change 'at' to @ to send email)	http://everettastro.org

EAS BUSINESS…

NEXT EAS MEETING – SATURDAY JUNE 21ST AT 7:00 PM AT AURORA ASTRO PRODUCTS STORE AT SILVER LAKE.

★★ Saturday June 21st 7:00 pm MEETING ★★
The presentation will be "Death Star" This video describes the 30-year struggle to understand the source of gamma bursts. The meeting will be the Aurora Astro Products store in Silver Lake. There will be some refreshments. (It may be helpful for some folks to bring a folding chair to the meeting.) We have the layout a bit, to improve seating, based on the larger crowds we have had at the last few meetings.

Map/Directions to Aurora Astro Products store location - http://www.skyvalleyscopes.com/aurora_astro_products_silver_lak.htm

Silver Lake Plaza, 11419 19th AVE. SE, Everett, WA 98208

If you are traveling northbound on I-5:

Take exit #186/128th St. and go east - to the right on 128th St. continue until you come to Murphy's Corner/Intersection with Highway 527/19th Ave SE/Old Bothell-Everett Highway (all one in the same) and turn left/north. Follow until you see Silver Lake Plaza (red brick construction) on your right with the lake is on your left.

If you are traveling southbound on I-5:

Take exit 187/Everett Mall Way and at the top of the exit's hill turn right following signs for Highway 527. At the light turn right following the signs for Highway 527. Then stay on Highway 527/19th Ave SE/Old Bothell-Everett Highway until you have Silver Lake on your right and the Silver Lake Plaza on your left. You may also continue down I-5 until exit 186 and turn left onto 128th then follow previous directions. If you have a problem you can always call (425) 337-4384

★ STAR PARTY INFO ★

Next EAS Star Party: Saturday July 5th at Ron Tam's home.

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 starparties. 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.

Upcoming tentative EAS star party schedule: (also see the regional star parties listed in the 'Astro Calendar for 2008') Jul 5, Aug 23, Sep 20, Oct 4, Nov 1.

Please also join the EAS mail list, and send mail to the mail list *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. (call Jim Bielaga at (425) 337-4384 for info or check the EAS website.) Members contact Jim Bielaga for scope borrowing.

DARK MOON PERIODS THIS YEAR

New Moon	1st Qtr	3rd Qtr	EAS Star Party at Ron's
Jan 8th	Jan 15th	Jan 29th	--
Feb 6th	Feb 13th	Feb 28th	--
Mar 7th	Mar 14th	Mar 29th	**Sat Mar 08, Sat Mar 29**
Apr 5th	Apr 12th	Apr 28th	**Saturday April 05**
May 5th	May 11th	May 27th	**Saturday May 03**
Jun 3rd	Jun 10th	Jun 26th	**Saturday Jun 07**
Jul 2nd	Jul 9th	Jul 25th	**Saturday Jul 05**
Aug 1st, 30th	Aug 8th	Aug 23rd	**Saturday Aug 23**
Sep 29th	Sep 7th	Sep 21st	**Saturday Sep 20**
Oct 28th	Oct 7th	Oct 21st	**Saturday Oct 04**
Nov 27th	Nov 5th	Nov 19th	**Saturday Nov 01**
Dec 27th	Dec 5th	Dec 19th	--

Other Western US Star Parties This Season…

Rooster Rock OR State Park 2008 RCA Star parties - 22 miles east of Portland on I-84 (east of Sandy River) at exit 25.
Jul 12 - Luna Viewing at Rooster Rock

Aug 11 - Perseid Meteor Shower Watch at Rooster Rock
Sep 06 - Autumnal Equinox Celebration at Rooster Rock
(503) 797-4610. http://www.omsi.edu/visit/planetarium/starparties.cfm

Jul 4-5, and Aug 1-2 - Stars Over Yellowstone star parties - Madison Campground Amphitheater, http://smasweb.org/

Jun 21-28 - 2008 Grand Canyon Star Party (GCSP) - On the South Rim - http://www.tucsonastronomy.org/gcsp.html

Jun 30-Jul 07 - Shingletown Star Party 2008 - Shingletown, Mt. Shasta, CA http://www.shingletownstarparty.org/

Jul 02-06 - Golden State Star Party - Frosty Acres Ranch, Adin, (northern, near Mt. Shasta) CA http://goldenstatestarparty.blogspot.com/

Jul 02-06 - The Rocky Mountain Star Stare (RMSS) 2008 - Pike Nat Forest, Colorado Springs, CO http://www.rmss.org/

Jul 31- Aug 02 – Table Mt. Star Party (TMSP) 2008 - Ellensburg WA http://www.tmspa.com/

Jul 31-Aug 02 2008 - 18th Annual Weekend Under the Stars - Foxpark WY - http://home.bresnan.net/~curranm/wuts.html

Aug 01-03 – RCA Trout Lake Star Party 2008 – Trout Lake WA http://www.rca-omsi.org/TroutLake2008.pdf

Aug 01-02 - Lava Hot Springs Star Party, Lava Hot Springs ID http://ifastro.org/web/index.php

Aug 02-10 - Mt. Kobau Star Party 2008 - Mt. Kobau, near Osoyoos BC http://www.mksp.ca/

Aug 06-10 - Mt Bachelor Star Party (MBSP) 2008 - Mt. Bachelor (Bend) OR http://www.mbsp.org/

Aug 29-31 - RASCals Star Party 2008 - Victoria Fish & Game Assoc - Holker Place, Malahat, (Near Victoria) BC, CA http://victoria.rasc.ca/events/StarParty/

Aug 25-31 – Oregon Star Party 2008 (OSP) - Ochocco NF http://www.oregonstarparty.org/

Aug 25-31 (Labor Day)– SAS Brooks Memorial Park Star Party 2008 – SR 97 near Goldendale http://www.seattleastro.org/events.shtml

Aug 30- Sep 07 Merritt Star Quest 2008, Loon Lake Site, near Kelowna BC http://www.merrittastronomical.com/index.html

(tbd) - **Deception Pass Star Party 2008** - Bowman Bay, Deception Pass, WA - http://www.eastsideastro.org/index.htm

Sep 05-07 - Idaho Star Party 2008 - Bruneau Dunes State Park http://www.boiseastro.org/

Sep 24-27 - The Enchanted Skies Star Party 2008 - Socorro NM - http://www.socorro-nm.com/starparty/

Sep 25-28 - OAS Camp Delany Star Party - Sun Lakes SP - http://www.olympicastronomicalsociety.com/Documents/FALLCAMPDELANYSign-UpForm.pdf

Sep 25-28 - Alberta Star Party 2008 – Eccles Ranch Obs., Caroline, Alberta, CA http://calgary.rasc.ca/RASCcalendar.htm#_September

Sep 25-27 - CalStar08 - Lake San Antonio Park CA http://www.sjaa.net/calstar/ - http://www.sjaa.net/

Sep 26-27 - Orion Nebula 2008 Star Party – Table Mt. (Ellensburg) WA http://www.seattleastro.org/orionnebsp.shtml

Oct 30-Nov 02 - Nightfall 2008 - Palm Canyon Resort, Borrego Springs, CA http://www.rtmcastronomyexpo.org/nightfall.htm

(tbd) - **White Sands Star Party** - Alamogordo/White Sands, NM http://www.zianet.com/wssp/

(tbd) **- Blue Mountain Star Party,** Ukiah, OR http://www.tri-cityastronomyclub.org/bluemtn_starparty.htm

(tbd) - **Montana Starwatch**, Great Falls, MT http://smasweb.org/

(tbd) **Craters Star Party** - Craters of the Moon National Monument, ID - http://www.boiseastro.org/

EAS MEMBER NEWS

Astronomy Monopoly, Anyone ?

Jim Bielaga has proposed holding an all-day astronomy monopoly tournament on a future Saturday. If it were held, would you participate? Let Jim know, by calling or emailing him to sign up – if we get enough folks interested, the event can go ahead.

Sidewalk Astronomy

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.

School and Community Group Astronomy Outreach

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. Please let club president know if you are interested and available to be on list of volunteers to handle these requests, so that we can say YES when people ask. Recent January cub-scout group visited by Jim Bielaga, Mark Folkerts, Mike Schilling, and Ron Tam for a star party night was a great example of how this can be a rewarding event for all involved.

Please email Mark Folkerts with your interest (or suggestions).

Attention EAS Members – 10% Discount for all Everett Astronomical Society Members at Aurora Astro Products

"Show your club membership card at Jim Bielaga's new astronomy store 'Aurora Astro Products' and receive a 10% discount on all purchases. This is an exclusive discount to E.A.S. members only.

I am proud to be able to offer this discount to Everett club members, and thanks for the support you have shown me on opening my new store. Also I have made great friends and learned a lot being a club member since 1991.

- Clear Skies, Jim Bielaga"

Members – please look at your EAS membership card 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.

Aurora Astro Products

"*Your Northern Light in the Astronomy Business*"
Over 37 product dealerships, and growing

11419 19th Avenue SE #A102
Everett, WA 98208 .
www.auroraastro.com .
425-337-4384 .
425-337-4758 fax .
New hours: .
Mon, Thu, Fri – 9:00 am to 6:00 pm .
Tues/Weds – Noon to 8:00 pm .
Sat – 10:00 am to 5:00 pm .

Also, 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.

$$ - Financial Health - $$

The club maintains a $750+ balance. We try to keep approximately a $500 balance to allow for contingencies. .

Club Scopes

Scope	Loan Status
10-inch Ward Dobsonian	Available
10-inch Sonotube Dobsonian	Available
8-inch Dobsonian	Available

EAS members: contact VP James Bielaga at (425) 337-4384 or jamesbielaga at aol.com to borrow a scope.

Does Anyone know about the history of the EAS ???

The Northwest Region of the Astronomical League (NWRAL) is putting together a new website and needs the following information from each club of the NWRAL. The EAS is looking for any information from members about the early history. Please contact Mark Folkerts if you have any info that could be of help. NRWAL would like a brief history of the club
- Club established date (approx 1986 ?)
- Who started the club (Terry Bacon, et. al.)
- When club joined the Astronomical League.

Astro Calendar for 2008

June 2008

Jun 07 - Mercury Inferior Conjunction
Jun 15 - Lyrids meteor shower peak
Jun 20 - Summer Solstice, 20:24 UT
Jun 20 - Pluto Opposition - Mag=13.9
Jun 26 - Bootids meteor shower peak
Jun 21 – EAS Meeting 7:00 pm Aurora Astro Products store
Jun 30 - Jul 07 2008 Shingletown Star Party, Shingletown CA

July 2008

Jul 01 - Mercury At Its Greatest Western Elongation (22 Degrees)
Jul 2-6 – Golden State Star Party – Adin CA (Frosty Acres Ranch)
Jul 04 - Earth At Aphelion (1.017 AU From Sun)
Jul 05 – EAS monthly suburban star party – Ron Tam's place
Jul 09 - Jupiter At Opposition
Jul 26 – EAS Meeting 7:00 pm Aurora Astro Products store
Jul 29 - South Delta-Aquarids meteor shower peak
Jul 31-Aug 02 – Table Mt. Star Party

August 2008

Aug 01-03 – RCA Trout Lake Star Party 2008 – Trout Lake WA
Aug 01 - Total Solar Eclipse, Visible in Canada, Greenland
Aug 01 - Alpha Capricornids meteor Shower Peak
Aug 2-10 – Mt Kobau Star Party – Osoyoos BC
Aug 06 - Southern Iota Aquarids meteor Shower peak
Aug 6-10 - Mt. Bachelor Star Party - near Bend, OR
Aug 12 - Perseids meteor shower peak
Aug 15 - Neptune At Opposition
Aug 16 – EAS Meeting 7:00 pm Aurora Astro Products store
Aug 16 - Partial Lunar Eclipse
Aug 17 - kappa-Cygnids meteor shower peak
Aug 19 11:12a Northern iota-Aquarids meteor shower peak
Aug 23 – EAS monthly suburban star party – Ron Tam's place
Aug 25-31 Oregon Star Party
Aug TBD - Deception Pass Star Party - Bowman Bay, Deception Pass, WA

September 2008

Sep 08 - delta-Aurigids meteor shower peak
Sep 11 - Mercury At Its Greatest Eastern Elongation (27 Degrees)
Sep 13 - Uranus At Opposition
Sep 19 - Piscids meteor shower peak
Sep 20 – EAS Meeting 7:00 pm Aurora Astro Products store
Sep 20 – EAS monthly suburban star party – Ron Tam's place
Sep 22 - Autumnal Equinox (22:16 UT)
Sep 26-28 – Orion Nebula Star Party – Table Mt. WA

October 2008

Oct 04 – EAS monthly suburban star party – Ron Tam's place
Oct 08 - Draconids meteor shower peak
Oct 17 - epsilon-Geminids meteor shower peak
Oct 21 - Orionids Meteor Shower Peak
Oct 25 – EAS Meeting 7:00 pm Aurora Astro Products store
Oct 27 - Asteroid 4 Vesta Closest Approach To Earth (1.539 AU)

November 2008

Nov 01 – EAS monthly suburban star party – Ron Tam's place
Nov 03 - Taurids meteor Shower Peak
Nov 17 - Leonids meteor Shower Peak
Nov 22 – EAS Meeting 7:00 pm Aurora Astro Products store

December 2008

Dec 01 - Conjunction of Moon, Venus, and Jupiter (3 Degree Triangle)
Dec 01 - Moon Occults Venus
Dec 13 - Geminids meteor shower peak
Dec 21 - Winter Solstice, 12:04 UT
Dec 22 - Ursids meteor shower peak
Dec 29 - Moon Occults Jupiter

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

On The Airwaves - KSER 90.7 - 'It's Over Your Head'

"Our group of radio script writers now consists of EAS and SAS members Jim Ehrmin, Greg Donohue, and Ted Vosk, who are now regularly writing and helping to produce our **astronomy radio show**, "**It's Over Your Head"** on radio station **KSER, FM 90.7.** The six-minute segment is broadcast **every Wednesday morning at approximately 7:20 A.M.** and gives a weekly look at what's up in the sky over Snohomish County, with other information. If you are a listener to the program, show your support by giving the program director of KSER a call!" Web page with lots of archives and other info is available at http://www.itsoveryourhead.org/

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 MEMBERSHIP BENEFITS & INFORMATION

EAS Benefits -
Membership in the **Everett Astronomical Society** (EAS) includes invitations to all of the club meetings and star parties, plus the monthly newsletter, ***The Stargazer.*** Currently, a 10% discount is also being offered to EAS members for purchases at Aurora Astro Products in Everett

Magazine Discounts –
In addition you will be able subscribe to ***Sky and Telescope*** for $7 off the normal subscription rate, contact the treasurer (Carol Gore) 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 Carol Gore 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 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 Jim Bielaga (425) 337-4384 to borrow a telescope.

10% Discount on Purchases at 'Aurora Astro Products' in Everett -
EAS members are currently offered a 10% discount for all purchases of any telescopes, accessories, or other items at Aurora Astro Products, when they show their EAS membership card.

EAS Library -
Membership will give you access to all the material in the lending library. The library, which is maintained by Mike Locke, 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 a club officer or **Librarian Mike Locke**, phone (425) 259-5995, email lockemi at comcast.net, to borrow or donate any materials. See list here: http://everettastro.org/eas_library.htm

Joining or Renewing with the EAS -

EAS dues are $25 / year per family. 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. 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

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

OBSERVER'S INFORMATION…

LUNAR FACTS

Jun 17	Full Moon
Jun 26	Last Quarter Moon
Jul 03	New Moon
Jul 10	First Quarter Moon
Jul 18	Full Moon
Jul 25	Last Quarter Moon
Aug 01	New Moon
Aug 08	First Quarter Moon
Aug 16	Full Moon
Aug 23	Last Quarter Moon
Aug 30	New Moon
Sep 07	First Quarter Moon

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

UP IN THE SKY -- THE PLANETS

Object	*Rises*	*Sets*	*Con*	*Diam.*	*Mag*
Sun	***05:11 am***	***21:11***	***Tau***	***30'***	***-27.5***
Mercury	**04:35 am**	**19:27**	**Tau**	**10"**	**+2.0**
Venus	05:24 am	21:26	Gem	10"	-3.9
Mars	9:46 am	**00:10 am**	**Can**	**5"**	**+1.6**
Jupiter	**22:57 am**	**06:57 am**	**Sag**	**47"**	**-2.7**
Saturn	**10:41**	**00:35 am**	**Leo**	**17"**	**+0.6**
Uranus	10:00 am	12:33	Aqr	4"	+5.8
Neptune	**23:55 am**	**9:59 am**	**Cap**	**2"**	**+7.9**
Pluto	**20:25**	**05:57 am**	**Sag**	**--**	**+13.9**

(times are in local time for Everett PDT)

Observing Jupiter's Moons – Java tool
http://skytonight.com/observing/objects/javascript/jupiter

Transit times for Jupiter's Great Red Spot in 2008
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

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

CONSTELLATIONS OF THE MONTH – SAGITTA AND CORONA BOREALIS

SAGITTA: (The Arrow). With a midnight culmination date of July 16th, Sagitta (pronounced "suh-gee'-tah") is well-placed for summer viewing. It contains no asterisms, but the stars of the constellation do trace out an arrow in the sky, situated approximately between the constellations of Aquila and Cygnus, its point pointing roughly towards the dolphin that is the constellation Delphinus. Besides Aquila and Delphinus (it does not officially border Cygnus), Sagitta also officially borders on the constellations of Vulpecula and Hercules. Sagitta ranks 18th in overall brightness among the constellations, but 86th in size; it takes up approximately 80 square degrees of the sky (0.194%). It contains no known meteor showers, but does contain one Messier object: M-71. Sagitta is completely visible from latitudes North of –69 degrees, and completely invisible from latitudes South of –74 degrees. It has 8 stars greater than magnitude 5.5, and its central point is at RA=19h37m, Dec.= +18.5 degrees. The solar conjunction date of Sagitta is January 15th. Sagitta is one of only two constellations whose abbreviation (Sge) contains a letter ('e') not found in the name of the constellation (the other constellation with this minor distinction is Hydrus). The famous legend of Sagitta the Arrow commemorates the magic arrow of Hercules,

which was used to kill Jupiter's pet eagle Aquila. Aquila had been inflicting repeated attacks on the chained Prometheus (who had stolen fire for use by earthly mortals without Jupiter's permission). Hercules sympathized with Prometheus and his rationale for stealing fire for use by mortals, and thus wanted to protect Prometheus from the repeated peckings and barrages of Aquila. He used his magic arrow (Sagitta) to kill Aquila in order to spare Prometheus these repeated attacks.

M-71 (NGC-6838) is a globular cluster with a total magnitude of 8.3, visible as a very loose bright cluster of over 100 stars, 7' across in a 12-inch telescope. Most of the component stars appear to be of 11th and 12th magnitude. M-71 lies midway between the 4th magnitude stars of Gamma and Delta Sagittae. Astronomers thought for many years that rather than being a globular, M-71 was actually a very rich open cluster; most astronomers now believe that it is indeed a globular, but an unusually loose one, not as compact and without the strong central stellar condensation typical of normal globular clusters. Other objects of interest within the constellation of Sagitta include Harvard 20, an open cluster less than one degree SW of M-71, and three planetary nebulae suitable for amateur telescopes: NGC-6879, IC-4997, and NGC-6886. Sagitta also contains some unusual stars, notably WZ-Sagittae, FG-Sagittae, and V-Sagittae.

WZ-Sagittae is a recurring nova, which last had an outburst in 1978; this resulted in its normal 15th magnitude brightening to 7th magnitude; it is expected to have another outburst around the year 2010. FG Sagittae is an unusual variable star, which progressively brightened (to about magnitude 9.5 from 13.7) for 75 years until the early 1970's, and currently appears to be surrounded by a slender nebulosity. V-Sagittae is an erratic variable star which varies irregularly between magnitudes 9.5 and 13.9 with overlapping periods of variability; this leads astronomers to believe that it may have been a nova at one time, or may indeed soon become one. Try to enjoy the beautiful and very interesting wonders of Sagitta this summer star party season.

CORONA AUSTRALIS: (The Southern Crown). With a midnight culmination date of June 30th, Corona Australis (abbreviated CrA) is perfectly placed for winter viewing in the Southern Hemisphere (i.e., when it is summer in the North). It contains no asterisms or Messier objects, but it does contain the radiant of one meteor shower: the Corona Australids (March 16th). Bordering constellations include Ara, Sagittarius, Scorpius, and Telescopium. Corona Australis ranks 2nd in overall brightness among the constellations (overall brightness is calculated by dividing the number of visible stars in a constellation by the size of the constellation in square degrees, and then multiplying that number by 100). Only the constellation of Crux has a higher overall brightness. Corona Australis ranks 80th in size, taking up only 127.69 square degrees (0.310% of the sky; note: this square degree factor would be the denominator in the above equation: the smaller the denominator the larger the result – in this case, overall brightness). The number of visible stars in this small constellation is relatively large: there are 21 stars brighter than magnitude 5.5.

Corona Australis is completely visible from latitudes South of +44 degrees, and completely invisible from latitudes North of +53 degrees. Its central point is at RA=18h35m, Dec.= -41.5 degrees. The solar conjunction date of Corona Australis is December 31st. Some interesting facts about CrA:

If the brightest stars of nearby Sagittarius form a 'teapot', then the brighter stars (gamma, alpha, beta, delta, zeta, eta, theta) of CrA are well known to form the 'slice of lemon' nearby. Gamma CrA is a very interesting double star: both stars are main sequence stars of spectral type F-8, and they are almost exactly of the same magnitude (4.84 and 5.08). Sir John Herschel is quoted as calling this double star "superb". (However, the pair is separated by only 1.2 arc seconds, rendering it difficult to separate with telescopes smaller than 6 inches of aperture. The orbital period of the system is 122 years.) An easier – but still beautiful - double star to separate within the borders of CrA is Kappa CrA: its separation is 21.2 arc seconds, and its magnitudes are 6.0 and 6.5. Corona Australis contains an interesting NGC object of note: NGC 6541. This is a bright (magnitude 6.1) globular cluster with a moderately compressed core and a loosely structured outer halo. Even though the brightest members of the cluster are at magnitude 12.3, it is still possible to resolve the cluster with 6-inch or larger scopes. Corona Australis – if you ever have the opportunity to visit the Southern Hemisphere – provides a very interesting binocular sweep.

YOUNG ASTRONOMER'S CORNER

Now is the time of year when many amateur astronomers' thoughts turn to observing outdoors with their telescopes, binoculars, etc… Here are some helpful hints for observing at outdoor telescope "STAR" PARTIES this season: enjoy the night sky warmly and safely!!!

★★ Dress warmly, or at least be prepared to do so. If the evening starts out warm, it may not end up that way!

★★ The warmest clothes include polypropylene worn directly against the skin; other warm clothes include those made of wool. Layered cotton clothing can also keep you warm, but you will tend to need more layering. Additionally, if cotton materials get wet, they do not transport moisture away from the body (like polypropylene and wool), but are rather more likely to chill you.

★★ Most body heat is radiated from the head, so make sure you have a good hat that also covers the ears. Good gloves are important as well. Polypropylene glove liners make excellent astronomy gloves because they are not bulky: it is thus easier to use equipment and read charts, etc….

★★ An excellent all-purpose piece of clothing for use in observing is a hooded-sweatshirt. A hooded sweatshirt can cut down on chilling winds entering down your neck: it essentially serves two purposes: it cuts down on the aforementioned wind effects, and it serves to contain body heat radiating from the head.

★★ Always wear warm socks. Socks that wick moisture away from the skin (such as wool or polypropylene) are excellent. Extra pairs for layering can come in handy too.

★★ A good windbreaker jacket (with an integral hood) is an excellent way to conserve body heat and minimize chill, and can be the outermost clothing in any necessary layering.

★★ Eat well and drink plenty of fluids to avoid dehydration. Good nutrition (including carrots which can improve night vision as a source of Vitamin A) and hydration can help to maintain alertness, body warmth, and help to battle fatigue. Most areas allow camp stoves, but open fires are prohibited. Alcohol and nicotine can interfere with the conservation of body heat. Also – and importantly – tobacco use can be very annoying to your fellow astronomers, as the majority are non-smokers. Further, some people have medical conditions which can be aggravated by cigarette smoke. If you must smoke, please smoke far enough away from people and delicate optical instruments which can pick up smoke film residues. So always be courteous to your fellow astronomers - and good to your own body - by not smoking!

★★ Always follow established STAR PARTY etiquette (which is usually published): red flashlights only at night, and extra batteries can be helpful. If you must listen to music, bring headsets, as your taste in music may be different than your neighbors. Follow STAR PARTY rules about pets: most allow them, but they must be leashed. ALWAYS ask another astronomer if it is OK to look through their scope before you do: some may be taking pictures, or they may not want to be disturbed at that particular time. Many if not most astronomers are very friendly and helpful – and love to have people look through their scopes – but be sure to ask first!

★★ STAR PARTIES are frequently held in remote areas. Always let someone know where you are and what your expected time of return will be: this is especially true if you go off on your own. In that respect, it is ALWAYS better to go in two's with a friend or fellow astronomer. If you have any allergies or other medical conditions, be sure to take your allergy and/or other medicines (including bee sting antidote and heart and asthma medicines, for example) with you: you will generally be at least an hour away from medical attention.

★★ You can enjoy a STAR PARTY without a telescope. IT IS NOT NECESSARY TO SPEND LOTS OF MONEY TO ENJOY THE NIGHT SKY. A lawn chair and a blanket, perhaps with a pair of binoculars and a basic night sky book or map of your choice, can result in countless hours of enjoyment and learning about astronomy without spending a lot of money or time in preparation. Going to an official STAR PARTY is a great way to learn and meet new people with varying levels of astronomy knowledge. NEVER be intimidated because you think someone may know more about the subject than you do: everybody starts somewhere!!!!!!.....and most astronomers love to answer questions about the night sky and astronomy equipment!!

★★ Finally, respect for your fellow astronomers by following the simple rules above, and respect for the environment while you are there (never leave trash; stay away from fragile areas of grass and wilderness), will also make your star party experience much more enjoyable. See you at an upcoming STAR PARTY!!

NOTE: This column will resume talking about stellar evolution - after the "Red Giant" stage of a star's life - later this summer.

ASTRONOMY & TELESCOPE LINGO

This column last published in May, and will return next month.

ASTRONOMY "FUN FACTS"

★★ About 500,000 craters on the Moon can be seen from the Earth with the world's largest and most powerful telescopes; this large amount does not include those craters on the Moon's far side, which cannot be seen from the Earth. It would take one person at least 400 continuous hours to count all the visible craters on the moon.

★★ Sunlight falling on one square yard of land in Arizona for one year was worth $83.00 in 1980. If all the sunlight falling on an Arizona one-acre home lot in all of 1980 were converted into electricity, it would have been worth almost $403,000 dollars at the time!

★★ Sunlight exerts a pressure on anything in its way, including the Earth; a square mile of sunlight, if it could be placed in one's hand, would weigh 3 pounds!!

★★ One square inch of the Sun shines with an intensity of 300,000 candles. In order to manufacture enough candles to equal the total brightness of the Sun, the amount of tallow needed would be 10 times larger than the mass of the Earth itself. If all those candles were placed on a birthday cake, the circumference of the cake would be equal to the orbit of the Earth around the Sun - almost 600 million miles!!! Make a wish and blow out the candles indeed!!!!!

PLANETARY FOCUS

This column last published in May, and will return later this summer.

"MIRROR IMAGES"

"MIRROR" IMAGES": Because we live in the Northern Hemisphere, we often tend to focus (in both observing and reading) on celestial objects in this hemisphere. The point of this column is to inform club members about similar objects in the Southern Hemisphere (to the ones we are already familiar with in the Northern Hemisphere). The general class of object will first be defined, and then a representative object from each hemisphere will be described. Note: "MIRROR" IMAGES" is strictly the name of this column, and is not intended to imply that there is optical mirror symmetry between the two objects.

Class of Object: SUPERGIANT: The largest and most luminous class of star. Supergiants lie above both the main sequence and the giant region of the Hertzprung-Russell diagram. Supergiants are classified in luminosity classes Ia (bright supergiants) and Ib (supergiants), and ordinarily have absolute bolometric magnitudes (the luminosity calculated over all wavelengths, instead of any one or several particular wavelengths) of between –5 and –12. These stars are very rare, since only the most immense stars become supergiants. Their brightness is so great however, that they can stand out in external galaxies. The absolute bolometric magnitude of cool red supergiants has an upper limit of –9.7; as a result, the brightest supergiants can also be used as indicators of distance. Supergiants have masses exceeding 50 solar masses, and diameters 100 to 1000 times greater than that of the Sun; supergiants are also 10 to 20 times hotter than the Sun, and 10,000 to one million times brighter!!

Representative Northern Hemisphere Object: P CYGNI: This bluish white supergiant in Cygnus has surface temperatures of approximately 25,000 degrees Celsius. P Cygni is an unstable variable star about 2,000 parsecs away. It has randomly undergone outbursts, and then faded, in recorded history; since 1700 however it has continually and gradually brightened. It is also an ultraviolet source; its UV brightness is decreasing as its visual brightness is increasing however.

There are many known stars (P Cygni stars) with similar characteristics to the P Cygni prototype; their spectra show numerous strong emission lines and sharp blueshifted (resulting from a continuously ejected and expanding shell of low

density matter) absorption lines. P Cygni stars are a subclass of luminous blue variables (LBVs), very massive stars known for sporadic mass ejections, which are most likely due to fluctuations in their stellar outer layer because of radiation pressure.

Representative Southern Hemisphere Object: ANTARES: In the constellation of Scorpius, Antares was one of the four Royal Stars of the ancient Persians (the others were Aldebaran, Regulus, and Fomalhaut). Antares is an M1 ruddy-colored supergiant (luminosity class Ia-b) of magnitude 0.9. It is about 700 times larger than the Sun, but is only about 15 times more massive than it because of its low density: it is about 600 million miles across and approximately 160 parsecs away from Earth.

Antares has a surface temperature of only a few thousand degrees, but it is the brightest star in Scorpius. Antares is also a visual binary with a 5th magnitude greenish companion.

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

NEW TYPE OF COMET DUST MINERAL FOUND

Researchers and scientists from the United States, Germany and Japan have found a new mineral in material that likely came from a comet. The mineral, a manganese silicide named '**Brownleeite'**, was discovered within an interplanetary dust particle, or 'IDP', that appears to have originated from comet 26P/Grigg-Skjellerup. The comet originally was discovered in 1902 and reappears every 5 years. The team that made the discovery is headed by Keiko Nakamura-Messenger. "*When I saw this mineral for the first time, I immediately knew this was something no one had seen before*," said Nakamura-Messenger. "*But it took several more months to obtain conclusive data because these mineral grains were only 1/10,000 of an inch in size*." A new method of collecting IDPs was suggested by Scott Messenger, another space scientist. He predicted comet 26P/Grigg-Skjellerup was a source of dust grains that could be captured in Earth's stratosphere at a specific time of the year.

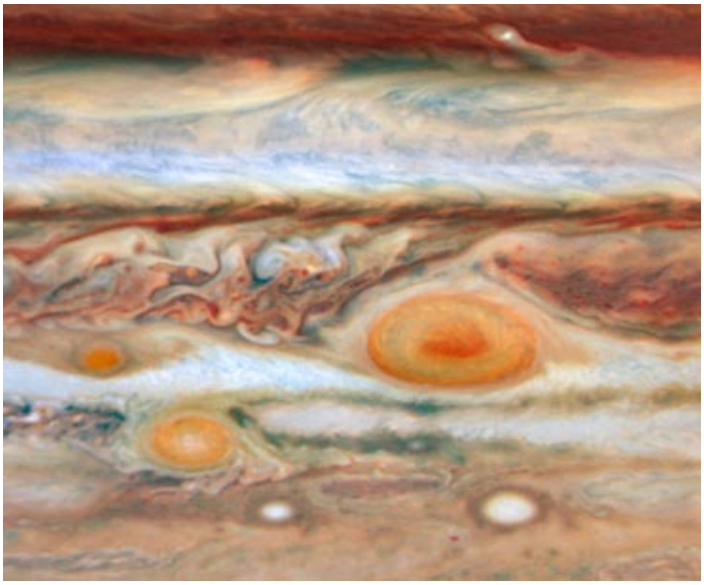
In response to his prediction, NASA performed stratospheric dust collections, using an ER-2 high-altitude aircraft flown from Dryden Flight Research Center at Edwards Air Force Base. The aircraft collected IDPs from this particular comet stream in April 2003. The new mineral was found in one of the particles. To determine the mineral's origin and examine other dust materials, a powerful new transmission electron microscope was installed in 2005 at Johnson. "*Because of their exceedingly tiny size, we had to use state-of-the-art nano-analysis techniques in the microscope to measure the chemical composition and crystal structure of Keiko's new mineral*," said Lindsay Keller, space scientist and a co-discoverer of the new mineral. "*This is a highly unusual material that has not been predicted either to be a cometary component or to have formed by condensation in the solar nebula*."

Since 1982, NASA routinely has collected cosmic and interplanetary dust with high-altitude research aircraft. However, the sources of most dust particles have been difficult to pin down because of their complex histories in space. The Earth accretes about 40,000 tons of dust particles from space each year, originating mostly from disintegrating comets and asteroid collisions. This dust is a subject of intense interest because it is made of the original building blocks of the solar system, planets, and our bodies.

The mineral was surrounded by multiple layers of other minerals that also have been reported only in extraterrestrial rocks. There have been 4,324 minerals identified by the International Mineralogical Association, or IMA. This find adds one more mineral to that list. *The IMA-approved new mineral, **Brownleeite, is named after Donald E. Brownlee, professor of astronomy at the University of Washington**. Brownlee founded the field of IDP research. The understanding of the early solar system established from IDP studies would not exist without his efforts. Brownlee also is the principal investigator of NASA's Stardust mission*.

NEW HUBBLE & KECK IMAGES SHOW TURBULENT JUPITER

Increased turbulence and storms first observed on Jupiter more than two years ago are still raging, according to astronomers who snapped high-resolution pictures of the planet earlier this month. Captured with Hubble Space Telescope (HST) and the 10-meter Keck II telescope, this so-called "major upheaval" on Jupiter involves stunning changes in the planet's atmosphere, said lead astronomer Imke de Pater, professor of astronomy at UC Berkeley.



http://hubblesite.org/newscenter/archive/releases/2008/23/

The upheaval was heralded in December 2005 by a color change from white to red of a large oval near the Great Red Spot, earning it the moniker Red Spot Jr. This oval, formally known as Oval BA, formed six years earlier through a merger of three large white ovals just south of the Great Red Spot - storms that formed in the early 1930s and were prominent in the Voyager era.

The new images, the first since Jupiter emerged from its passage behind the Sun, may show that Jupiter indeed is undergoing a major climate change, as predicted four years ago. "*One of the most notable changes we observe in both the Hubble and Keck images is the change from a rather bland, quiescent band surrounding the Great Red Spot just over a year ago to one that is incredibly turbulent at both sides of the spot*," de Pater said. "*During all previous HST observations and spacecraft encounters, starting with Voyager in 1979, such turbulence was seen only on the west or left side of the spot*."

The Great Red Spot is a persistent, high-pressure storm on Jupiter whose cloud head sticks some 8 kilometers (5 miles) above the surrounding cloud deck. Why the spots are red is a subject of great debate. Moreover, the color of several bands on the planet has been changing since the upheaval began, said Christopher Go, an amateur astronomer in Cebu, the Philippines, who joined de Pater's team two years ago. Go alerted the astronomical community in early 2006 about the color change of Red Spot Jr. "*Lately, the red color of the Oval BA has faded a little bit, while the Great Red Spot may have turned dark red*," Go said.

The team will work with the amateur astronomy community to investigate the possible origin of this turbulence, which is not understood.

The Great Red Spot and Red Spot Jr. are squeezed between bands called shear flows, where the flow above each storm is moving westward and the flow below is moving eastward. Since the shear flow in each band is slightly different, and the storms are different sizes, Red Spot Jr. drifts slowly eastward toward the Great Red Spot while the Great Red Spot drifts slightly westward

toward Red Spot Jr. In late June, this storm will pass the Great Red Spot, as it does every two years. Interestingly, a third red spot has appeared to the west of the Great Red Spot in the same latitude band. "*Although much smaller in extent, the color is striking*," said team member Michael Wong. "*Like the other two large red storm systems, this newest red spot is bright in near-infrared wavelengths and dark in the ultraviolet. If this spot and the Great Red Spot continue on their courses, they will encounter each other in August, and the small oval will either be absorbed or repelled from the Great Red Spot*."

According to Philip S. Marcus, a professor of fluid dynamics, analysis of the Hubble and Keck images may support his 2004 conjecture that Jupiter is in the midst of global climate change that will alter temperatures by as much as 10 degrees Celsius, getting warmer near the equator and cooler near the south pole. He predicted that large changes would start in the southern hemisphere around 2006, causing the jet streams to become unstable and spawn new vortices. "*The appearance of the planet's cloud system from just north of the equator down to 34 degrees south latitude keeps surprising us with changes and, in particular, with new cloud features that haven't been previously observed*," Marcus said. "*Whether or not Jupiter's climate has changed due to a predicted warming, the cloud activity over the last two and a half years shows dramatically that something unusual has happened*." "*A major goal in taking the Hubble images is to look for changes in the zonal wind profile since the Cassini encounter in 2000*," added team member Xylar Asay-Davis. "*If we do find major changes, these could provide important supporting evidence for climate change on Jupiter*."

The red coloration in the ovals may be generated as their swirling hazes rise to heights like the clouds of the Great Red Spot. Detailed analysis of the Hubble's visible light data and the Keck images at near-infrared wavelengths will reveal the relative altitudes of the cloud tops of the three red ovals, de Pater said. Since all three oval storms are bright at near-infrared wavelengths where methane gas is absorbing, the data already show that all three systems rise up well above the surrounding cloud deck.

The Hubble telescope imaged the entire planet on May 9 and 10, while Keck II focused on the area around the Great Red Spot on May 11 using adaptive optics to sharpen the image.

Dr. Al Conrad, a support astronomer at the Keck Observatory, noted that the team used adaptive optics (AO) to obtain a spatial resolution comparable to that obtained at visible wavelengths with the Hubble telescope. Adaptive optics can take the twinkle out of an object caused by turbulence in the atmosphere, but to do this well, the target must be near another bright object that can serve as a reference. For some of the images, Jupiter's moon Europa was used as the reference "star." But until Europa was visible off the limb of Jupiter, a laser guide star was created near Jupiter to serve this purpose.

"*This was our second attempt using the laser to obtain AO-corrected images of Jupiter's surface*," Conrad said. "*Based on our past experience, we placed the laser beacon slightly farther from Jupiter's bright glow. With this adjustment in place, AO revealed much finer detail on the surface than we saw during our previous observation. By using the laser whenever there is no moon available as an AO reference, we will now have many more opportunities to observe Jupiter with Keck*."

In addition to images at 1.2-1.65 microns, where Jupiter's reflected infrared light is measured, the team also obtained a close-up of the three spots at the somewhat longer infrared wavelength of 5 microns that samples thermal radiation from deeper in the atmosphere. All three spots appear dark on the 5-micron image because the clouds obscure heat emanating from lower elevations. "This image is spectacular," says de Pater. "*There is an amazing amount of fine structure and numerous small ovals south of the spots. This image reveals details in the cloud opacity not seen at the other wavelengths*."

BRIGHT CHUNKS AT PHOENIX LANDER'S SITE MUST BE ICE

Dice-size crumbs of bright material have vanished from inside a trench where they were photographed by Phoenix Mars Lander four days earlier, convincing scientists that the material was frozen water that vaporized after digging exposed it. "*It must be ice*," said Phoenix Principal Investigator Peter Smith. "*These little clumps completely disappearing over the course of a few days, that is perfect evidence that it's ice*," Smith added. "*There had been some question whether the bright material was salt. Salt can't do that*."

The chunks were left at the bottom of a trench informally called "Dodo-Goldilocks" when Phoenix's Robotic Arm enlarged that trench on June 15, during the 20th Martian day, or sol, since landing. Several were gone when Phoenix looked at the trench early today, on Sol 24.

Also, digging in a different trench, the Robotic Arm connected with a hard surface that has scientists excited about the prospect of next uncovering an icy layer.

Studying the initial findings from the new "Snow White 2" trench, located to the right of "Snow White 1," Ray Arvidson, co-investigator for the robotic arm, said, "*We have dug a trench and uncovered a hard layer at the same depth as the ice layer in our other trench*."

On Sol 24, Phoenix extended the first trench in the middle of a polygon at the "Wonderland" site. While digging, the Robotic Arm came upon a firm layer, and after three attempts to dig further, the arm went into a holding position. Such an action is expected when the Robotic Arm comes upon a hard surface. http://phoenix.lpl.arizona.edu

MOUSE THAT ROARED: PIPSQUEAK STAR UNLEASHES MONSTER FLARE

On April 25, the Swift satellite picked up the brightest flare ever seen from a normal star other than our Sun. The flare, an explosive release of energy from a star, packed the power of thousands of solar flares. It would have been visible to the naked eye if the star had been easily observable in the night sky at the time.

The star, known as EV Lacertae, isn't much to write home about. It's a run-of-the-mill red dwarf, by far the most common type of star in the universe. It shines with only one percent of the Sun's light, and contains only a third of the Sun's mass. At a distance of only 16 light-years, EV Lacertae is one of our closest stellar neighbors. But with its feeble light output, its faint magnitude-10 glow is far below naked-eye visibility. "*Here's a small, cool star that shot off a monster flare. This star has a record of producing flares, but this one takes the cake*," says Rachel Osten. "*Flares like this would deplete the atmospheres of life-bearing planets, sterilizing their surfaces*."

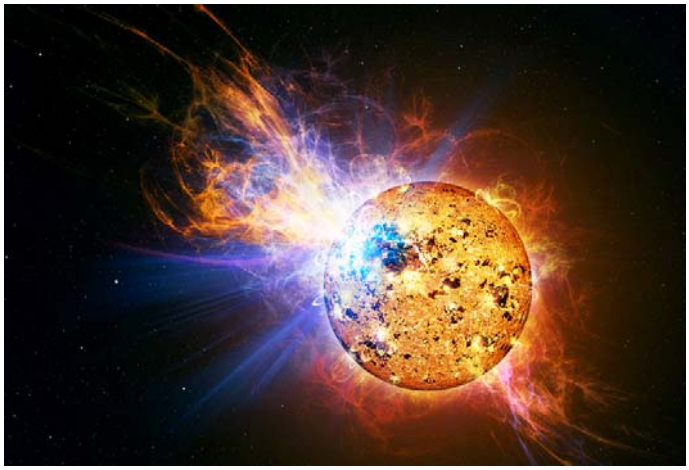
The flare was first seen by the Russian-built Konus instrument on NASA Wind satellite in the early morning hours of April 25. Swift's X-ray Telescope caught the flare less than two minutes later, and quickly slewed to point toward EV Lacertae. When Swift tried to observe the star with its Ultraviolet/Optical Telescope, the flare was so bright that the instrument shut itself down for safety

reasons. The star remained bright in X-rays for 8 hours before settling back to normal.

EV Lacertae can be likened to an unruly child that throws frequent temper tantrums. The star is relatively young, with an estimated age of a few hundred million years. The star rotates once every four days, which is much faster than the sun, which rotates once every four weeks. EV Lacertae's fast rotation generates strong localized magnetic fields, making it more than 100 times as magnetically powerful as the Sun's field. The energy stored in its magnetic field powers these giant flares.

EV Lacertae's constellation, Lacerta, is visible in the spring for only a few hours each night in the Northern Hemisphere. But if the star had been more easily visible, the flare probably would have been bright enough that the star could have been seen with the naked eye for one to two hours. The flare's incredible brightness enabled Swift to make detailed measurements. "*This gives us a golden opportunity to study a stellar flare on a second-by-second basis to see how it evolved*," says Stephen Drake.

Since EV Lacertae is 15 times younger than our Sun, it gives us a window into our solar system's early history. Younger stars rotate faster and generate more powerful flares, so in its first billion years the sun must have let loose millions of energetic flares that would have profoundly affected Earth and the other planets.



Flares release energy across the electromagnetic spectrum, but the extremely high gas temperatures produced by flares can only be studied with high-energy telescopes like those on Swift. Swift's wide field and rapid repointing capabilities, designed to study gamma-ray bursts, make it ideal for studying stellar flares. Most other X-ray observatories have studied this star and others like it, but they have to be extremely lucky to catch and study powerful flares due to their much smaller fields of view. Says Eric Feigelson "*I find it remarkable that a satellite designed to detect the explosive birth of black holes in distant galaxies can also detect explosions on stars in the immediate neighborhood of our Sun*."

http://www.nasa.gov/centers/goddard/images/content/226765main_pipsqueak.jpg

FASTEST ROTATING NATURAL OBJECT IN SOLAR SYSTEM FOUND

A British amateur astronomer has discovered the fastest rotating natural object known in our Solar System, using data from FT South. His observations, made using a telescope normally shared by school students and professional scientists as part of the Las Cumbres Observatory Global Telescope Network (LCOGTN), have proved that the newly-discovered asteroid, 2008 HJ is revolving once every 42.7 seconds, classifying it is as a 'superfast rotator'. His discovery will boost our sparse knowledge of near Earth asteroids and is another successful find for the Faulkes Telescope near-Earth asteroid project.

The folded lightcurve of 2008 HJ -

The astronomer Richard Miles made his exciting discovery on Tuesday 29th April using the Faulkes Telescope South (located at Siding Spring, Australia), which he operated remotely via the Internet from his home in Dorset. Confirmation of his discovery was formally announced by the International Astronomical Union on Thursday 22nd May. The previous record holder was asteroid 2000 DO8, discovered eight years ago and found to rotate once every 78 seconds. The Science and Technology Facilities Council (STFC) was involved in the initial set-up of the Faulkes Telescope Project and continues to provide support.

This latest discovery is the most recent outcome of a new project to use the Faulkes Telescopes, situated in Hawaii and Australia, to survey the properties of small (<150-metre) near-Earth asteroids. UK schools and colleges have already participated in the project, which in April had an early success having found that asteroid 2008 GP3 rotates once every 11.8 minutes. Asteroid 2008 HJ was only the fourth object observed as part of this study.

The observations suggest that 2008 HJ is a compact stony object some 12m x 24m in size, smaller than a tennis court yet probably having a mass in excess of 5,000 tons. It was moving at almost 45 kilometers per second (more than 100,000 mph) when it hurtled past the Earth in late April. Despite being classified as a "near-Earth asteroid", it came no closer than 1 million km and never posed a threat to our planet.

Dr Paul Roche, the director of the Faulkes Telescope Project at Cardiff University, said: "*A discovery like this demonstrates the capabilities of amateur astronomers and school students to produce exciting scientific results if given the right tools. By providing Richard with access to a big telescope we have smashed the previous record, and opened up the search for even faster objects to UK amateur astronomers and school students. This helps to put all that classroom science, math and IT to real use*!"

The early success for the Faulkes Telescope near-Earth asteroid project bodes well for the future and should prove especially encouraging to schools, colleges and other amateur astronomers looking to participate. It now appears that the chances of success are high and one challenge will be to find objects spinning even faster than 2008 HJ. Cooperation between all the observing groups, whether they are astronomers or schools students, will be essential if asteroid rotation rates are to be accurately identified.

Dr Petr Pravec, an astronomer who is an expert in this field, commented: "*A period of 42.7 seconds for an asteroid with a size of about 20 meters is perfectly consistent with theory there may be a significant population of asteroids measuring up to a few tens of meters across, rotating in less than a minute, that have not been observed until now*".

Our knowledge of the near-Earth population of small asteroids is very sparse, so schools and others can contribute directly to our understanding of these nearest neighbors of ours. It is believed that most of these objects are probably fragments ejected from collisions between larger bodies which took place some time in the distant past. However, other objects may have originated when the solar nebula was formed over 4.6 billion years ago. http://faulkes-telescope.com/files/faulkes-telescope.com/image/2008HJ_lightcurve.jpg

MILKY WAY MAPPING FINDS SURPRISINGLY SLOW STARS

On Earth, making a map is as easy as taking aerial photographs or surveying a patch of land on foot. In contrast, mapping the Milky Way galaxy is a tremendous challenge. The distances are too large to travel, making bird's-eye views or direct surveys impossible. Instead, astronomers must make do with the view from Earth, which is embedded in the galaxy itself. It's like a sardine, 400 miles offshore, trying to figure out the size and shape of the Pacific Ocean. For astronomers, the edge-on view and obscuring dust make it difficult to map anything farther than about 6,000 light-years, at least using visible light.

Now, ultra-precise radio measurements using the Very Long Baseline Array (VLBA) have given astronomers their first good look at the structure of the Milky Way and the motions of its young stars. Already, the measurements have turned up a big surprise: the mapped stars are orbiting slower than expected and moving in looping, oval paths rather than circling the galactic center.

"*Almost all of our targets seem to have been accelerated opposite the direction of the galaxy's rotation*," said astronomer Mark Reid. Reid speculated that the accelerating force came from the galaxy's spiral arms. The Milky Way's spiral pattern comes from a phenomenon called a density wave, which acts like an astronomical traffic jam. Just as cars stuck behind a slow-moving truck catch up to each other and slow down, gas clouds approaching a spiral arm catch up to each other and slow down. They also compress, birthing the hot, young stars that Reid studied.

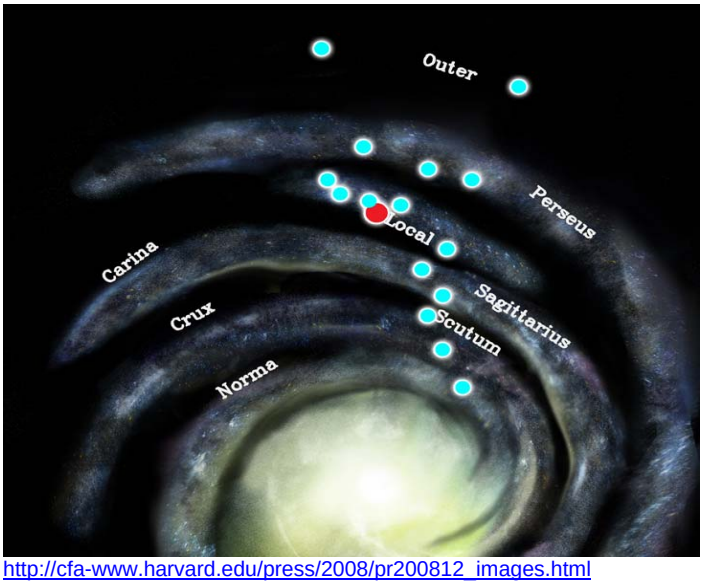
The slowing motion and resulting loss of angular momentum shift the stars' orbits from circular to elliptical. Since previous efforts to map the Milky Way assumed that stars orbit in circles, the resulting maps have intrinsic errors.

Reid used the VLBA to measure the parallax, or apparent shift in position on the sky as the Earth orbits the Sun, for masers in about a dozen star-forming regions. He then applied basic geometry to calculate highly accurate distances to each region. He also was able to observe the motion of each maser in the plane of the sky. Combining those data with motions along the line of sight yielded the true, 3-d motion of each target through space.

The VLBA's capabilities were crucial to this project. "*The VLBA runs so smoothly that it makes my work easy*," Reid said. He added that the accuracy of the VLBA exceeds that of any other mapping instrument. "*The previous gold standard, the Hipparcos satellite, could measure positions of stars to an accuracy of 1 milli-arcsecond. We're doing 100 times better with the VLBA*."

Reid and his colleagues in Germany, Italy, and China plan to continue this mapping project by racking up several dozen more targets in the years to come. Ultimately, this work will help answer basic questions about the structure of the Milky Way. "*We don't even know how many spiral arms the Milky Way has-two or four*," Reid explained.

Reid also looks forward to the launch of Hipparcos' successor, the European Space Agency's spacecraft Gaia. It will map the positions of up to 1 billion stars located as far as 30,000 light-years from Earth. "*Right now, our map of the Milky Way still has large areas marked 'Here there be dragons.' Ten years from now, those areas will be filled in*," Reid said.



http://cfa-www.harvard.edu/press/2008/pr200812_images.html

MILKY WAY'S STRUCTURAL BEAUTY REVEALED

We live in the Milky Way galaxy -- a disk-shaped collection of about 400 billion stars including the Sun. Many of those stars and much of the dense gas between the stars concentrate into large arms that spiral outward from the galactic center.

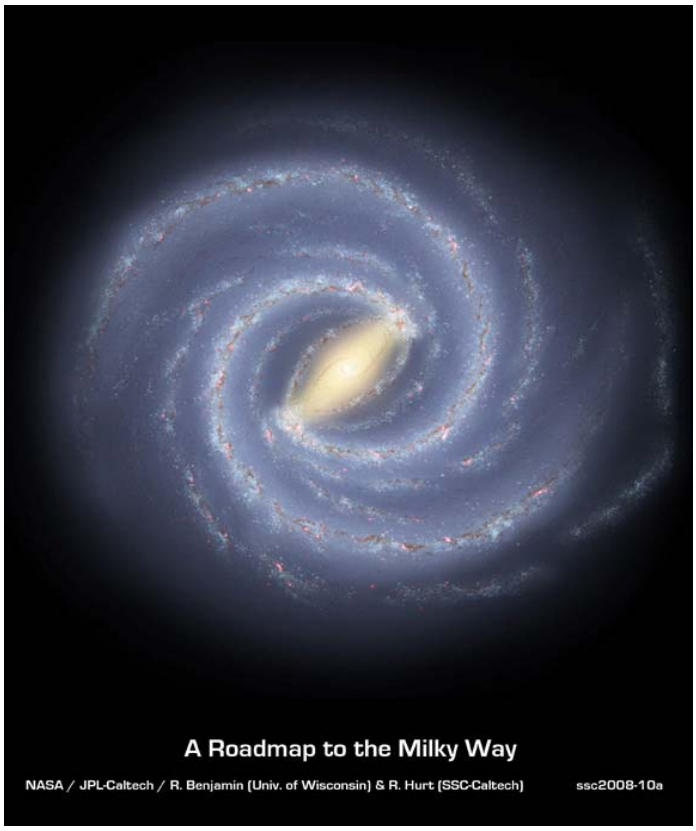
Astronomers have worked for decades to map the Milky Way and its spiral arms. They have just discovered a new spiral arm on the far side of the galactic center from Earth, which is a virtual twin of a known arm on the near side of the galactic center. The Milky Way therefore shows a beautiful symmetry, with two matching spiral arms lazily spinning near the galaxy's center.

Tom Dame presented this finding at the 212th American Astronomical Society meeting. "*Our galaxy isn't as messy as many thought. What we have found is evidence of some balance and order, like the yin and yang of Chinese philosophy*," said Dame. The Milky Way has other, larger spiral arms farther out in the galactic disk. This study focuses on the two arms closest to the center of the galaxy,

A 50-year puzzle solved - Fifty years ago, radio astronomers found an unusual spiral arm about 10,000 light-years from the center of the Milky Way along our line of sight. They called it the expanding 3-kiloparsec (3-kpc) arm since 3 kpc equals 10,000 light-years, and it was found to be expanding away from the center at more than 50 kilometer per second. The expanding 3-kpc arm contains about 10 million sun's worth of gas, mostly hydrogen atoms and molecules. They suspected a similar arm might exist on the far side of the Milky Way, since many other galaxies tend to be symmetrical. But for decades, they were unable to find any evidence for a far-side counterpart of the expanding 3-kpc arm. One reason is that the galactic center is so crowded, with many different hydrogen gas clouds overlapping the same patch of sky. "*Studying the galactic center is like listening to a conversation in the middle of a crowded cocktail party. There's lots of noise*," said Dame's colleague Patrick Thaddeus.

Dame and Thaddeus analyzed data obtained using a 1.2-meter-diameter millimeter-wave telescope located at Cerro Tololo Inter-American Observatory in Chile. When Dame processed the data to highlight large-scale structures very close to the plane of the galaxy, a new feature jumped out at him. The data clearly showed a spiral arm exactly where the far 3-kpc arm should be, with

properties like radius, expansion velocity, mass, and brightness that were mirror images of the near 3-kpc arm.



Spiral arms and galactic bar linked - Dame and Thaddeus suspect that the 3-kpc spiral arms are linked to the galactic bar. At the center of the Milky Way, billions of stars inhabit an elongated conglomeration called a stellar bar, which extends for several thousand light-years on either side of the galactic center. As that central bar rotates, it produces large-scale shock waves that likely sculpt the 3-kpc spiral arms and power their outward motions. In fact, theorists believe that those spiral arms connect to the ends of the bar. "*The 3-kiloparsec arms are a natural result of the stellar bar*," explained Thaddeus. "*We expected that the bar should drive symmetric structure. Now, we have proof that it does*."

Dame and Thaddeus confirmed their discovery using 21-centimeter radio measurements of atomic hydrogen collected by colleagues in Australia. Next, they plan to apply for observing time on the Robert C. Byrd Green Bank Telescope to examine the 3-kpc spiral arms in more detail. They also want to extend their observations to greater galactic longitudes as seen from Earth. "*We want to see how far we can chase these arms -- hopefully to their origins at the ends of the central bar*," said Dame. http://cfa-www.harvard.edu/press/2008/pr200813_images.html

WEIGHING THE COLDEST BROWN DWARFS WITH ASTRONOMY'S SHARPEST EYES

Astronomers have used ultrasharp images obtained with the Keck Telescope and Hubble Space Telescope to determine for the first time the masses of the coldest class of "failed stars," a.k.a. brown dwarfs. With masses as light as 3 percent the mass of the sun, these are the lowest mass free-floating objects ever weighed outside the solar system. The observations are a major step in testing the theoretical predictions of objects that cannot generate their own internal energy, both brown dwarfs and gas-giant planets. The new findings, which are being presented at the American Astronomical Society meeting in St. Louis, show that the predictions may have some problems.

"*Mass is the fundamental parameter that governs the life-history of a free-floating object, and thus after many years of patient measurements, we are delighted to report the first masses of the very faintest, coldest brown dwarfs*," said Dr. Michael Liu. "*After weighing these tiny, dim, cold objects, we have confirmed that the theoretical predictions are mostly correct, but not entirely so*."

Brown dwarfs are a class of objects that represent the missing link between the lowest-mass stars and the gas-giant planets, such as Jupiter and Saturn. Brown dwarfs are the faintest and coolest objects that can be directly observed outside the solar system. They emit as little as about 1/300,000 the energy of the sun and have surface temperatures comparable to the inside of a pizza oven (800 F), more than 9,000 F cooler than the surface of the sun.

"*Astronomers have measured the energy output and temperatures for a myriad of brown dwarfs. However, the most important property of all is the hardest one to measure -- the mass*," said Dr. Ireland. To determine the masses, the team has spent the last several years studying brown dwarfs that occur in binaries, that is two brown dwarfs that are mutually bound together by gravity and orbit each other, in a fashion similar to how Earth orbits the sun. As first shown by Johannes Kepler in the 17th century, the total mass of any binary system can be determined by precisely measuring the orbit's size and how long it takes for the two objects to complete one orbital cycle. "*These are very challenging measurements, because brown dwarf binaries have tiny separations on the sky and orbit each other very slowly. We needed to obtain the sharpest measurements that are possible with current telescopes to precisely monitor their motion*," said Mr. Dupuy.

The astronomers obtained images using the 10-meter (400-inch) Keck II Telescope on Mauna Kea, Hawaii. Keck II is equipped with a powerful adaptive optics system that corrects for the blurring of astronomical images caused by turbulence in Earth's atmosphere. The Keck system can also employ a low-power laser to create an "artificial" star to enable such correction for almost anywhere in the sky. The resulting images have an angular resolution as good as 1/20 of an arc second, about 1/40,000 the diameter of the full moon. A person with vision as sharp as the Keck adaptive optics system would be able to read a magazine that was about a mile away. In fact, the positional accuracy achieved with such sharp images is equivalent to hitting a bull's-eye on a dartboard that is 8,000 miles away.

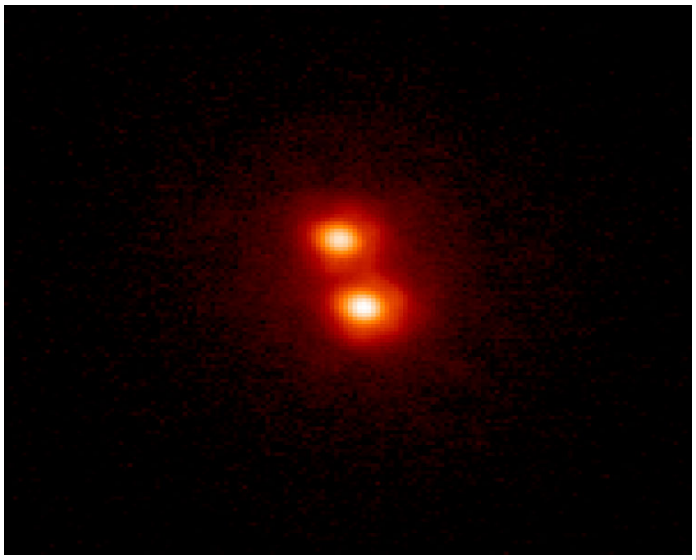
By regularly monitoring binaries with Keck adaptive optics and analyzing previous data obtained by the Hubble Space Telescope, the team was able to precisely measure the size and duration of the binaries' orbits, and thereby determine the masses.

The team measured the masses of two brown dwarf binaries. One, known as 2MASS 1534-2952AB, is composed of two "methane" brown dwarfs, the coolest type of brown dwarf, which is characterized by the presence of methane gas in their atmospheres. This is the first mass measurement for this type of brown dwarf. The team found that the total mass of 2MASS 1534-2952AB is only 6 percent of the sun's mass, and each brown dwarf in it has a mass of about 3 percent of the sun's (about 30 times the mass of Jupiter). The other binary system, HD 130948BC, is a pair of slightly warmer "dusty" brown dwarfs with a total mass of only 11 percent of the sun's mass and individual masses of about 5.5 percent of the sun's.

Theoretical models predict the masses of brown dwarfs based on their energy output and temperature. But when the team compared their mass measurements to the theoretical predictions, they did not agree. For example, the surface temperature of 2MASS 1534-2952AB was much cooler than expected given its current level of energy output, while HD 130948BC was much warmer.

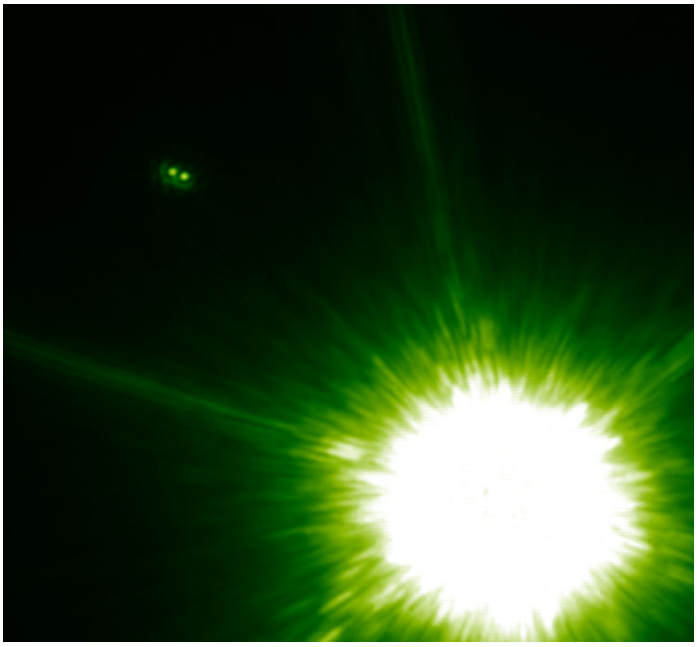
"*While there is general agreement between our data and the predictions, something is not quite right with the theoretical studies of brown dwarfs, either in determining their temperatures or in predicting their energy output. Or perhaps both*," said Dr. Liu. "*These findings will be a challenge for the theorists, and we are inspired to measure the masses of more brown dwarfs in the coming years to better understand the problem*."

The two binaries, located in the constellations of Libra (the Scales) and Bootes (the Herdsman), are about 45-60 light-years from Earth. The two components of each binary have a typical separation of about 2 astronomical units (AU), where 1 AU is the distance from Earth to the sun (93 million miles). This is somewhat larger than the 1.5 AU distance between Mars and the sun. Their orbital periods are about 10-15 years, compared with 2 years for Mars around the sun. The team's results are described in two upcoming papers.



First discovered in 1995, brown dwarfs represent a class of objects with masses less than 7 percent the mass of the sun (about 70 times Jupiter's mass). While ordinary stars become hot and dense enough in their interiors to generate their own energy via nuclear fusion, brown dwarfs have insufficient mass to do this, so instead they steadily fade and cool over their lifetime. In many ways, brown dwarfs are very similar to gas-giant planets like Jupiter and Saturn, since both types of objects are unable to steadily generate their own energy and have very low surface temperatures. Scientists have discovered hundreds of brown dwarfs within 100 light-years of Earth. About 15 percent of them are binary systems.

http://www.ifa.hawaii.edu/info/press-releases/Liu_AAS_June08/2mass1534-29.jpg Infrared image of the very low-temperature binary 2MASS 1534-2952AB, composed of two methane brown dwarfs. This was obtained with the laser guide star adaptive optics system on the Keck II Telescope, located on Mauna Kea, Hawaii. The image is 1.5 arc seconds across (about 1/1,000 of the size of the moon), and the binary's separation is about 0.2 arc seconds. Each component of the binary has a mass of about 3 percent the mass of the sun and emits about 1/100,000 the energy of the sun. These are the coolest free-floating objects ever directly weighed outside the solar system. Credit: Dr. Michael Liu



http://www.ifa.hawaii.edu/info/press-releases/Liu_AAS_June08/HD130948.jpg Infrared image of the dusty brown dwarf binary HD 130948BC. The binary is seen in the upper left and has a total mass about 11 percent the mass of the sun. The binary is in orbit around a young sun-like star, seen to the lower right. This image was obtained with the adaptive optics system on the Keck II Telescope, located on Mauna Kea, Hawaii. The image is 3.75 arc seconds on a side (about 1/500 the size of the moon), and the binary's separation is about 0.1 arc seconds. Credit: Mr. Trent Dupuy and Dr. Michael Liu (Institute for Astronomy, University of Hawaii).

'PLUTOID' CHOSEN AS NAME FOR OBJECTS LIKE PLUTO

The International Astronomical Union has decided on the term plutoid as a name for dwarf planets like Pluto at a meeting of its Executive Committee in Oslo. Almost two years after the International Astronomical Union (IAU) General Assembly introduced the category of dwarf planets, the IAU, as promised, has decided on a name for transneptunian dwarf planets similar to Pluto. The name 'plutoid' was proposed by the members of the IAU Committee on Small Body Nomenclature (CSBN), accepted by the Board of Division III, by the IAU Working Group for Planetary System Nomenclature (WGPSN) and approved by the IAU Executive Committee at its recent meeting in Oslo, Norway.

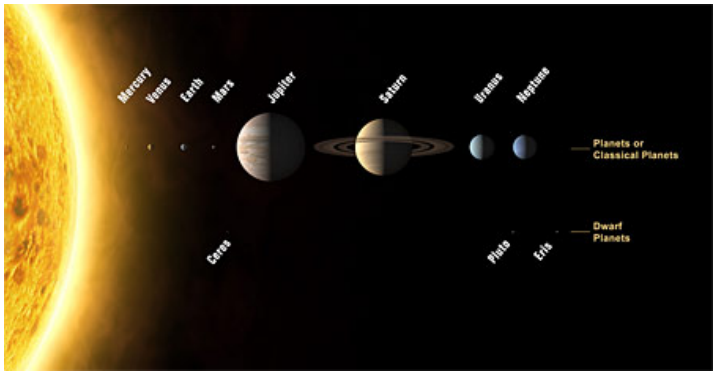
'Plutoids' are celestial bodies in orbit around the Sun at a distance greater than that of Neptune that have sufficient mass for their self-gravity to overcome rigid body forces so that they assume a hydrostatic equilibrium (near-spherical) shape, and that have not cleared the neighborhood around their orbit. The two known and named plutoids are Pluto and Eris. It is expected that more plutoids will be named as science progresses and new discoveries are made.

The dwarf planet Ceres is not a plutoid as it is located in the asteroid belt between Mars and Jupiter. Current scientific knowledge lends credence to the belief that Ceres is the only

object of its kind. Therefore, a separate category of Ceres-like dwarf planets will not be proposed at this time.

The IAU has been responsible for naming planetary bodies and their satellites since the early 1900s. The IAU CSBN, who originally proposed the term plutoid, is responsible for naming small bodies (except satellites of the major planets) in the Solar System. The CSBN will be working with the IAU WGPSN to determine the names of new plutoids to ensure that no dwarf planet shares the name of another small Solar System body. The WGPSN oversees the assignment of names to surface features on bodies in the Solar System. These two committees have previously worked together to accept the names of dwarf planet Eris and its satellite Dysnomia.

In Oslo, members of the IAU also discussed the timing involved with the naming of new plutoids. Again, following the advice of the Division III Board and the two Working Groups, it was decided that, for naming purposes, any Solar System body having (a) a semimajor axis greater than that of Neptune, and (b) an absolute magnitude brighter than H = +1 magnitude will be considered to be a plutoid, and be named by the WGPSN and the CSBN. Name(s) proposed by the discovery team(s) will be given deference. If further investigations show that the object is not massive enough and does not qualify as a plutoid, it will keep its name but change category.



The absolute magnitude H for planets, dwarf planets, comets and asteroids allows astronomers to compare the brightness of objects as if they all sat one astronomical unit from the Sun and the Earth and at a phase angle of zero degrees. In this scale, increasing brightness corresponds to a decreasing magnitude. Apparently bright objects can have negative magnitudes while positive magnitudes indicate to dim objects.

http://www.iau.org/public_press/themes/pluto/
http://www.iau.org/static/archives/images/screen/iau0804a.jpg

ASTRONOMERS UNEARTH HIDDEN CELESTIAL GEM

ESA's orbiting X-ray observatory XMM-Newton has re-discovered an ignored celestial gem. The object in question is one of the youngest and brightest supernova remnants in the Milky Way, the corpse of a star that exploded around 1000 years ago. Its shape, age and chemical composition will allow astronomers to better understand the violent ways in which stars end their lives.

Exploding stars seed the Universe with heavy chemical elements necessary to build planets and create life. The expanding cloud of debris that each explosion leaves behind, known as a supernova remnant (SNR), is a bright source of X-rays and radio waves. Generally, the debris is thought to appear as an expanding bubble or ring.

When astronomers took the first high-resolution radio images of a celestial object known as 'G350.1-0.3' in the 1980s, they saw an irregular knot of gases that did not seem to meet these expectations. So it was classified as a probable background galaxy and was quietly forgotten.

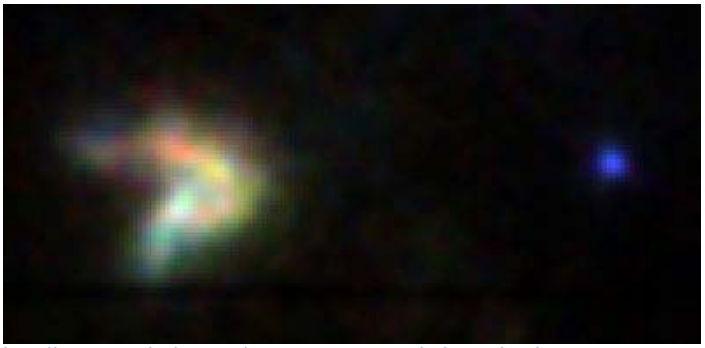
Now Bryan Gaensler and Anant Tanna have used the X-ray capabilities of XMM-Newton with their colleagues to prove that appearances can be deceptive. G350.1-0.3 is indeed the debris of an exploded star despite its misshapen configuration. In fact, it turns out to be one of the youngest and brightest supernova remnants in the Milky Way. To explain its shape, the team looked at radio surveys and discovered that G350.1-0.3 had exploded next to a dense cloud of gas about 15 000 light-years from Earth. The cloud prevented the blast from expanding evenly in all directions, resulting in an example of a rare kind of misshapen supernova remnant.

G350.1-0.3 is incredibly small and young in astronomical terms, only eight light years across and about 1000 years old. "*Only a handful of such young supernova remnants are known. So even having one more is important*," says Tanna. That is because young supernova remnants are highly luminous, with the newly-formed chemical elements glowing brightly, making them easier to study.

"*We're seeing these heavy elements fresh out of the oven*," says Gaensler. Young supernova remnants exhibit the newly created elements and also contain clues about the way the original star exploded. Such information is lost in most supernova remnants because, as they expand and age, they lose their initial characteristics. "*After 20,000 years, all sorts of explosions look more or less the same*," says Gaensler.

Astronomers now recognize that stars explode in many different ways. Some might be just big enough for an explosion to occur, others might be much more massive. There are differences in the chemical composition of the exploding stars and some may have a companion star in orbit around them.

Gaensler and Tanna hope that further investigations of G350.1-0.3 will yield clues as to exactly what kind of star exploded. "*It may turn out that many of the youngest supernova remnants have these strange shapes*," says Tanna, "*The hunt to find more is now on*." Despite the light from the supernova having reached Earth during the time of William the Conqueror, Gaensler thinks humans would not have seen it. "*The X-ray data tell us that there's a lot of dust lying between it and Earth. Even if you'd been looking straight at it when it exploded, it would've been invisible to the naked eye*," he says. Thankfully, XMM-Newton's sensitivity and the detective work by Gaensler and Tanna mean that this important celestial object will never again be forgotten.



http://www.esa.int/esaCP/SEM1OPUG3HF_index_1.html

TRIO OF SUPER-EARTHS - LOW-MASS EXOPLANETS DISCOVERED

A team of European astronomers announced a breakthrough in the field of extra-solar planets. Using the HARPS instrument at the ESO La Silla Observatory, they have found a triple system of super-Earths around the star HD 40307. Moreover, looking at their entire sample studied with HARPS, the astronomers count a total of 45 candidate planets with a mass below 30 Earth masses and an orbital period shorter than 50 days. This implies that one solar-like star out of three harbors such planets.

"*Does every single star harbor planets and, if yes, how many?"* wonders planet hunter Michel Mayor from Geneva Observatory. "*We may not yet know the answer but we are making huge progress towards it*." Since the discovery in 1995 of a planet around the star 51 Pegasi by Mayor and Didier Queloz, more than 270 exoplanets have been found, mostly around solar-like stars. Most of these planets are giants, such as Jupiter or Saturn, and current statistics show that about 1 out of 14 stars harbors this kind of planet.

"*With the advent of much more precise instruments such as the HARPS spectrograph on ESO's 3.6-m telescope at La Silla, we can now discover smaller planets, with masses between 2 and 10 times the Earth's mass*," says Stephane Udry, one of Mayor's colleagues. Such planets are called super-Earths, as they are more massive than the Earth but less massive than Uranus and Neptune (about 15 Earth masses).

The group of astronomers have now discovered a system of three super-Earths around a rather normal star, which is slightly less massive than our Sun, and is located 42 light-years away towards the southern Doradus and Pictor constellations.

"*We have made very precise measurements of the velocity of the star HD 40307 over the last five years, which clearly reveal the presence of three planets*," says Mayor. The planets, having 4.2, 6.7, and 9.4 times the mass of the Earth, orbit the star with periods of 4.3, 9.6, and 20.4 days, respectively. "*The perturbations induced by the planets are really tiny -- the mass of the smallest planets is one hundred thousand times smaller than that of the star -- and only the high sensitivity of HARPS made it possible to detect them*," says co-author Francois Bouchy. Indeed, each planet induces a motion of the star of only a few meters per second.

At the same conference, the team of astronomers announced the discovery of two other planetary systems, also with the HARPS spectrograph. In one, a super-Earth (7.5 Earth masses) orbits the star HD 181433 in 9.5 days. This star also hosts a Jupiter-like planet with a period close to 3 years. The second system contains a 22 Earth-mass planet having a period of 4 days and a Saturn-like planet with a 3-year period as well. "*Clearly these planets are only the tip of the iceberg*," says Mayor. "*The analysis of all the stars studied with HARPS shows that about one third of all solar-like stars have either super-Earth or Neptune-like planets with orbital periods shorter than 50 days*."

A planet in a tight, short-period orbit is indeed easier to find than one in a wide, long-period orbit. "*It is most probable that there are many other planets present: not only super-Earth and Neptune-like planets with longer periods, but also Earth-like planets that we cannot detect yet. Add to it the Jupiter-like planets already known, and you may well arrive at the conclusion that planets are ubiquitous*," concludes Udry.

TWINKLE, TWINKLE, ANY STAR – SUN NOT SO SPECIAL

Astronomers have found there is nothing special about the Sun after conducting the most comprehensive comparison of it with other stars -- adding weight to the idea that life could be common in the universe. Scientists have long argued about whether or not the Earth has some special characteristics that led to the evolution of life. Researcher Jose Robles and Dr. Charley Lineweaver contend that this is a difficult question to answer because we don't have information about other Earth-like planets. "*Yet the question 'How special is the Sun?' is easier to address because we do have observations of thousands of other Sun-like stars*," explains Dr Lineweaver.

Rather than guess what properties a star should have to enable life, the researchers decided to compare the Sun -- which already hosts a life bearing planet -- to other stars. "*Our research goes further than previous work which only looked at single properties such as mass or iron content*," says Robles, who is the lead author on the research paper. "*We looked at 11 properties that could plausibly be connected with life and did an analysis of these properties: The upshot is that there doesn't seem to be anything special about the Sun. It seems to be a random star that was blindly pulled out of the bag of all stars*."

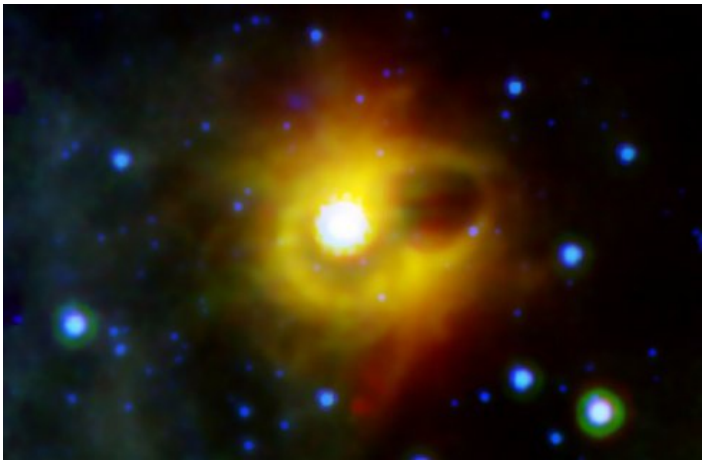
The researchers found that the Sun's mass is the most anomalous of its properties; the Sun is more massive than 95 per cent of stars. The Sun's orbit around the center of the galaxy is also more circular than the orbits of 93 per cent of its peers. "*But when analyzing the 11 properties together, the Sun shows up as a star selected at random, rather than one selected for some life-enhancing property*," Robles says.

The research is part of the ongoing scientific understanding of our place in the universe. "*Those who are searching for justification for their beliefs that terrestrial life and humanity in particular are special, will probably interpret this result as a humiliating dethronement*," says Dr Lineweaver. "*Those who believe we are the scum of the universe, may find our non-special status uplifting*."

STRANGE RING FOUND CIRCLING DEAD STAR

The Spitzer Space Telescope has found a bizarre ring of material around the magnetic remains of a star that blasted itself to smithereens. The stellar corpse, called SGR 1900+14, belongs to a class of objects known as magnetars. These are the cores of massive stars that blew up in supernova explosions, but unlike most other dead stars, they have tremendously strong magnetic fields.

The ring was found serendipitously. "*I was flipping through archived Spitzer data and that's when I noticed SGR 1900+14 was surrounded by a ring we'd never seen before*," says Stefanie Wachter of Spitzer Science Center. "The universe is a big place and weird things can happen!"



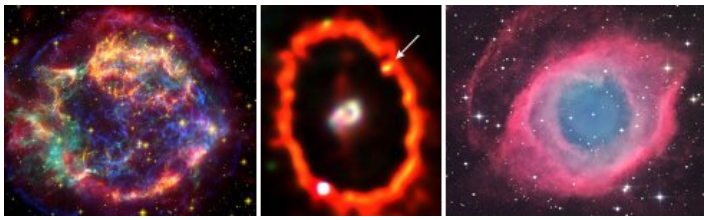
A ring around SGR 1900+14 observed by the infrared Spitzer Space Telescope. Wachter and her colleagues think that the ring, which is unlike anything ever seen before, formed in 1998 when the crusty iron surface of the magnetar cracked and erupted in a giant flare. The blast was so powerful, it ionized Earth's upper atmosphere and actually overloaded the instruments of several spacecraft.

Researchers believe the magnetar was surrounded by a cloud of dust and the explosion excavated that cloud, leaving an outer, dusty ring. The ring is oblong, with dimensions of about seven by three light-years. It appears to be flat, or two dimensional, but the data do not rule out the possibility of a more complex 3-dimensional shell. "*It's as if the magnetar became a huge flaming torch and obliterated the dust around it, creating a massive cavity*," says co-investigator Chryssa Kouveliotou. Nearby stars lit up the ring so that Spitzer could see it--"a ring of fire marking the magnetar for eternity."

Rings and spheres are common in the universe. For instance, young massive stars use their stellar wind to blow bubbles in space, carving clouds of dust into spherical shapes. Later, when those stars die in supernova explosions, their remains are blasted away, forming beautiful orbs called supernova remnants. Rings can also form around exploded stars whose expanding shells of debris ram into pre-existing dust clouds, causing the dust to glow, as is the case with the supernova remnant 1987A.

But the ring around the magnetar SGR 1900+14 fits into none of these categories. For one thing, supernova remnants and the ring around 1987A cry out with X-rays and radio waves. The ring around SGR 1900+14 does not; it only glows at specific infrared wavelengths that Spitzer can see.

A selection of rings and spheres in the Milky Way. From left to right, (1) light echoes from old supernova remnant Cassiopeia A, (2) a blast wave emerging from recent supernova 1987A, and (3) a planetary nebula named The Helix. The ring around SGR 1900+14 is like none of these things.



At first, the astronomers thought the ring around SGR 1900+14 must be an infrared echo. These occur when an object sends out a blast wave that travels outward, heating up dust and causing it to glow with infrared light. But when they went back to observe SGR 1900+14 later, the ring didn't move outward as an infrared echo would.

A closer analysis revealed that the ring is most likely a carved-out cavity in a dust cloud -- a phenomenon that must be somewhat rare in the universe because it had not been seen before. The discovery could help scientists figure out if a star's mass influences whether it becomes a magnetar when it dies. Though scientists know that stars above a certain mass will "go supernova," they do not know if mass plays a key role in determining whether the stellar corpse becomes a magnetar or a run-of-the-mill dead star. According to the science team, the glowing ring of dust Spitzer observed connects SGR 1900+14 to a nearby cluster of young stars. By studying the masses of those stars, the scientists might be able to figure out the original mass of SGR 1900+14. "*SGR 1900+14 is interacting with its environment, making a big impact on the region where it was born*," concludes astronomer and co-investigator Enrico Ramirez-Ruiz. "*This 'dead star' is still alive in many ways*."

PHOENIX MARS LANDER CONFIRMS FROZEN WATER

Scientists relishing confirmation of water ice near the surface beside Phoenix Mars Lander anticipate even bigger discoveries from the robotic mission in the weeks ahead. "*It is with great pride and a lot of joy that I announce today that we have found proof that this hard bright material is really water ice and not some other substance*," said Principal Investigator Peter Smith, during a news briefing to announce the confirmation of water ice. "*The truth we're looking for is not just looking at ice. It is in finding out the minerals, chemicals and hopefully the organic materials associated with these discoveries*," said Smith

The mission has the right instruments for analyzing soil and ice to determine whether the local environment just below the surface of far-northern Mars has ever been favorable for microbial life. Key factors are whether the water ever becomes available as a liquid and whether organic compounds are present that could provide chemical building blocks and energy for life.

The key new evidence is that chunks of bright material exposed by digging on June 15 and still present on June 16 had vaporized by June 19. "*This tells us we've got water ice within reach of the arm, which means we can continue this investigation with the tools we brought with us*," said Mark Lemmon, lead scientist for Phoenix's Surface Stereo Imager camera. He said the disappearing chunks could not have been carbon-dioxide ice at the local temperatures because that material would not have been stable for even one day as a solid.

The disappearing chunks were in a trench to the northwest of the lander. A hard material, possibly more ice, but darker than the bright material in the first trench, has been detected in a second trench, to the northeast of the lander. Scientists plan next to collect and analyze surface soil from a third trench near the second one, and later to mechanically probe and sample the hard layer. "*We have in our ice-attack arsenal backhoeing, scraping and rasping, and we'll try all of these*," said Ray Arvidson, lead scientist for the Robotic Arm. Phoenix landed on May 25 for a Mars surface mission planned to last for three months.

FROM THE EDITOR'S TERMINAL

The Stargazer is <u>your</u> 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 or co-editor Bill O'Neil, at (774) 253-0747.

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

In June's StarGazer:

The next EAS Meeting is 7:00 P.M. Saturday June 21st at the 'Aurora Astro Products' store location at Silver Lake.