



# The PRETORIA CENTRE

of the

## Astronomical Society of Southern Africa

[www.pretoria-astronomy.co.za](http://www.pretoria-astronomy.co.za)

### NEWSLETTER OCTOBER 2010

#### Next meeting

**Venue:** The auditorium behind the main building at Christian Brothers College (CBC), Mount Edmund, Pretoria Road, Silverton, Pretoria.

**Date and time:** Wednesday 27 October at 19h15.

**Programme:**

- ◆ **Beginner's Corner:** "Pretoria Centre of the ASSA Observing Programme" by Percy Jacobs
- ◆ **What's Up in the Sky:** by Hein Stoltsz
- ◆ 10 minute break — library will be open
- ◆ **Main talk:** "Software for the amateur astronomer" by James Thomas (**N.B.**)
- ◆ Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Johan Smit.

Next observing evening: Friday 22 October at the Pretoria Centre Observatory, which is also situated at CBC. Turn left immediately after entering the main gate and follow the road. Arrive from sunset onwards.

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### Last month's meeting - by Tony Viljoen

#### Beginner's Corner.

Barbara Cunow gave a clear explanation of "Orbital Basics", with Kepler's laws as the basis. She emphasized important relationships such as "equal areas in equal time" from these laws.

#### What's Up in the Sky.

This was delivered by Michael Poll in his usual competent manner. Something to keep in mind is that both Uranus and Jupiter are at opposition and close in the sky to one another, so it is easy to locate Uranus.

#### Main Talk: "The Large Scale Structure of the Universe" by Ad Sparrius.

This is a very difficult subject to explain, and Ad started at the basics of our galaxy, which has a slight bar structure. He explained how vast distances could be estimated, by Hubble finding Cepheids in Andromeda and from their brightness/period relationship, calculating the ~2 million light year distance to this large member of our galaxy group. He added a sprinkle of humour ('homogenous' is not a very clever gay guy) now and then to keep our attention. Hubble then showed that there are galaxies external and distinct from our own, and from the Hubble equation, relating distance and velocity by the Hubble constant which has a modern value of 74 km/sec/Mparsec. We also get from this the Hubble time (the inverse of this constant) to be 13,8 billion light years. He explained a structure called the Great Wall and another called the Great Void (and also the more recently discovered Sloan Great Wall). From this reasoning, he mentioned a major imbalance in the region of huge mass concentration called the Great Attractor, but that there is still not enough mass there to explain the structure and that it requires a concept of dark energy to account for it. Ad mentioned that there are about  $2 \times 10^{11}$  galaxies in the observable universe, and that about 5% of galaxies are not in clusters. He also mentioned that galaxy structures are often in the form of filaments or sheets. All in all a very expansive subject. We look forward to getting him in for a talk again in the future.

### The August meeting – by Hein Stoltz

Although perhaps not the best attendance thus far this year, the meeting was well attended, including by a number of welcome visitors. Johan Smit again reminded everyone of the upcoming 2010 ASSA Symposium and encouraged members to register as soon as possible.

In "Beginner's Corner" Percy Jacobs gave a brief overview of "Spectroscopy for the Amateur", explaining how a vast amount of information about stars and other celestial objects can be derived from its light spectrum using relatively simple instruments.

Danie Bernardo's "What's Up in the Sky" for September highlighted some interesting alignments for the month, including the opportunity to observe several planets. A handy website providing excellent information about the planets and their visibility can be found at

<http://homepage.ntlworld.com/mjpowell/Astro/Naked-Eye-Planets/Naked-Eye-Planets.htm>

Spring also provides the opportunity to observe both winter and summer constellations, provided one is willing to devote both the hours before and after midnight to stargazing! Best dark sky observing is from 4-13 September. See

[http://www.moonconnection.com/moon\\_phases\\_calendar.phtml](http://www.moonconnection.com/moon_phases_calendar.phtml)

Jupiter, the "King of the planets" is a very fine object for the whole month. A handy free-ware programme to enhance your viewing can be found at:

<http://www.astrosurf.com/rondi/jupiter/>

A map of the night sky is also available at:

<http://www.planetarium.co.za>

The main speaker for the evening was Hubrecht Ribbens, a recently joined member of the Pretoria Centre. His presentation, the first in a series of three on "Celestial Cataloguing: The Sextillion Challenge" was "An introduction to celestial cataloguing" and covered terminology, an historical overview of celestial cataloguing, the more popular celestial cataloguing systems in

use today and celestial cataloguing as a tool for astrophysical and astronomical research. Some interesting data from Australian astronomers suggest an estimated 70 sextillion stars in the known Universe, embedded in galaxies or elsewhere (70 sextillion =  $70 \times 10^{60} = 70$  trillion trillion – more than all the grains of sand on all the beaches of the Earth). The Hubble Guide Star Catalogue, the biggest celestial catalogue, contains about 19 million celestial objects of which 15 million are stars. There are also an estimated 300 million galaxies in the known Universe. We certainly look forward to Hubrecht's continuation of the series and the expectation of leaving us gasping in awe at the enormity of the known visible universe, which may in the end turn out to be a mere fraction of the actual universe!

The evening was concluded with coffee and biscuits and some lively conversations stimulated by the interesting presentations.

### “What's Up in the Sky” for November – by Hein Stoltz

**Phases of the Moon:** New Moon on 6 November, First Quarter on the 13<sup>th</sup>, Full Moon on the 21<sup>st</sup> and Last Quarter on the 28<sup>th</sup> of November.

**Planets:** Mercury (mag -0.7) is visible in the evening sky, climbing higher each night toward its greatest eastern elongation in early December. Brilliant Jupiter (mag -4.7) lies high in the north as evening twilight fades and sets well past midnight. With Scorpius sinking progressively lower in the southwest with each passing night, Mars (mag 1.4) moves steadily eastward against the background stars, passing to the right of Antares during the first half of November. The two appear closest on the 10<sup>th</sup> and it's interesting to compare the Red Planet with the red supergiant star. The name Antares means “rival to Mars” and the two have remarkably similar colours. Their brightnesses nearly match this month as well, with Mars just slightly fainter. Venus (mag -4.0), low in the eastern twilight remains a morning feature all month for an hour or so before sunrise, climbing higher and shining brighter each morning. Saturn (mag 0.9) also moves steadily away from the sun in the eastern morning sky, but will be hard to spot until later in the month. Expect better views of this telescopic favourite in the coming months as it climbs higher. Uranus (mag 5.8) and Neptune (mag 7.9) are both visible until about midnight. Interesting groupings of the Moon, Mars, Antares and Mercury can be seen early evening on the 7<sup>th</sup> and 8<sup>th</sup>, and of Saturn, Spica and Venus early morning of the 28<sup>th</sup>.

**Meteor showers:** Conditions are good to favourable to observe the southern and northern Taurids meteor showers on the 5<sup>th</sup> and 12<sup>th</sup>, respectively.

**Other objects:** As spring progresses, most of the clusters and nebulae along the Milky Way appear disappointingly low in the evening sky. Yet all is not lost and some gems are to be found in two satellite galaxies of the Milky Way, the Small and Large Magellanic Clouds. More details on the Magellanic Clouds and the globular cluster, 47 Tucanae, will be provided during the presentation.

Some sources of information on what there is to observe are:

- <http://www.skyandtelescope.com/observing/ataglance>
- <http://www.heavens-above.com/>
- <http://skymaps.com/>
- <http://spaceweather.com/>
- <http://spaceweather.co.za/>
- <http://www.sao.ac.za/public-info/sun-moon-stars/>
- <http://www2.jpl.nasa.gov/calendar/>
- Sky Guide Africa South 2010.

## Last month's observing evening - by Michael Poll and Neville Young



Neville warms his hand while speaking to the Voortrekkers !

Another successful evening – there were nine telescopes and a host of interested and appreciative visitors. The nine day old moon provided good viewing. The crater Copernicus was right on the edge of the terminator, and so experiencing sunrise. The crater floor was full of shadow, and only top part of the sunlight side of crater wall was illuminated. Eratosthenes, at the end of the Apennine Mountains was nicely placed, and the craters Archimedes, Autolycus, and Arisitillus were noted,

the latter three forming an almost right angled triangle. In the lunar north, Plato was as prominent as ever, and the isolated peaks Pico and Piton, nearby in the Mare Imbrium were identified.

Venus was showing a lovely crescent which will become slimmer, but will probably not be seen at the October observing evening, because Venus will be passing through inferior conjunction on October 29<sup>th</sup>. Mars was still close to Venus, but was getting lost in the twilight, as was the star Spica, which Venus and Mars had passed earlier in September.

Jupiter was well up in the east and was duly observed. All four moons were visible, with Callisto way out on one side, and on the other side Io, Ganymede and Europa in that order. Io was noticeably closer to Jupiter later in the evening. Uranus is still close to Jupiter, and was seen by many. Even a younger visitor picked out the greenish colour of Uranus. These two planets will remain close to each other for a few more months.

Because of the moon and light pollution, not many deep sky objects were observed, but M7 in Scorpius was picked out, and later on Michael had a look at Zeta ( $\zeta$ ) Lyrae, which is a wide double. Zeta is the third star in an equilateral triangle, the other two stars of which are Epsilon Lyrae and Vega. One so often looks at Epsilon (the “Double Double”) that Zeta is neglected.

Most people had packed up and left by about 9.30 pm, there was only Michael, Rudolph and Zac still there, when a latecomer came with two small children, and we were disappointed that they had missed out on viewing, but Zac saved the day (or night!). He was waiting for a lift, and still had his telescope out, so the children were able to have a look at the moon and Jupiter and they enjoyed the views very much – they were almost jumping up and down with excitement!

Also during the evening, another show was going on. At 6 p.m. Neville Young gave a solar system primer talk to four young Voortrekkers. The class was made bigger by the various parents and big brothers who also joined in. Using his Portable Solar System Model, Neville was able to help the youngsters understand exactly why they could see Mars, Venus and Jupiter where they appeared as darkness fell, but also why they could not at the time, see Saturn and Mercury. They were also able to understand how Venus would soon be dipping between us and the Sun and reappear in a couple of months in the early hours as the Morning Star. Jupiter's being so close and bright right now will allow it to take over the honour of being the “Evening Star”.

Of course, although they now knew where Uranus was, they had to wait until it was found a bit later in a 12 inch Dobsonian. Uranus is less than 1 degree away from Jupiter. Jupiter itself showed a stunning image comprising one belt visible, one belt missing, and the four Galilean moons. The Great Red Spot turned up a bit late for the party. The audience was very excited to know that not many people (relatively speaking) have actually seen Uranus.

The Voortrekker contingent enjoyed their evening under the stars and amongst the many telescopes. Neville feels sure that they will have no problem earning their Voortrekker Astronomy Badge.

# STAR GAZER'S DEEP SPACE ATLAS

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[www.deepspaceatlas.com](http://www.deepspaceatlas.com)

## Observation planning & logging with SkyTools3 - by James Thomas

James Thomas, a member of the Pretoria Centre of the ASSA, sent me the following e-mail message:

I've done quite a bit of research on the various Astronomy Software packages available - Internet based, Free and Commercial applications. I've determined that probably the best one at the moment for the purposes of Observation planning and subsequent Observation logging is "SkyTools 3" from Skyhound. Their web link is: <http://www.skyhound.com/index.html>

The April 2010 Sky & Telescope has a review and had the following to say: "**One Program that 'does it all' for observers; Powerful tools for generating observation lists; Easy-to-use system for logging your observations; I have little doubt I could erase every other astronomy program from my hard drive and get along fine with just SkyTools 3.**"

With this in mind I'm about to buy a copy of the Professional edition, but then noticed that Astronomy Clubs can get "bulk order" discounts of between 25% and 50% depending on numbers. So I want to know if any other Pretoria Centre members (**or any other persons**) would be interested to do a "combined" order and in so doing save a bit of money. The numbers add up to the following (\$ means US \$):

Quantity Ordered	Discount	Standard Edition Each	Standard in ZAR	Pro Edition Each	Pro in ZAR
2-9	25%	\$74.96	R535.96	\$134.96	R 964.96
10-24	40%	\$59.97	R428.79	\$107.98	R 772.06
25 or more	50%	\$49.98	R357.36	\$89.98	R 643.36
<b>Normal Price:</b>	—	<b>\$99.95</b>	<b>R714.64</b>	<b>\$179.95</b>	<b>R1 286.64</b>

R/\$ Exchange rate: R7.15 = \$1.00 (**Note:** This fluctuates continuously.)

Shipping for up to 50 copies: \$55 = R393.25.

Shipping per unit would be less depending on size of order - shared.

The discount is computed on the total number of copies ordered (Standard + Professional).

So if only a few (less than 9) others are interested, we could save between R200+ for the Standard edition and R300+ for the Professional edition each. If this would be an acceptable request to the other Club members, could you distribute this to them?

If Pretoria Centre members (**or any other persons**) are interested, they are welcome to contact me and we'll then make arrangements. Email: [mailit2@gmail.com](mailto:mailit2@gmail.com) Cell: 082 658 8444.

**Editor's note: I think it will be wise to first go and attend James' presentation on 27 October at CBC before deciding to buy this or any other similar software.**

### Camrin Bouwer

Camrin Bouwer is 'n lid van ons tak van die ASSA. Sy het in Pretoria gewoon. Sy is 'n ingenieur in opleiding. In Januarie vanjaar het sy na Musina (voorheen Messina) verhuis en werk nou vir De Beers Consolidated Mines. Ons beste wense vir haar in haar nuwe werk en woonplek.

### Teleskoop te koop

Mare du Preez wil sy teleskoop verkoop. Dis 'n Skywatcher 8" Black Diamond Dobsonian vir R5000. Bel 073 656 9114.

### ASSA Symposium 2010

Congratulations to Andrie du Toit, Danie Barnardo and Johan Smit for a successful symposium and excursions. More about this in next month's newsletter. - Editor.

### First light for the Solar Dynamics Observatory

Researchers have unveiled "first light" images from NASA's Solar Dynamics Observatory (SDO), a space telescope designed to study the Sun. "SDO is working beautifully," reports the project scientist. "This is even better than we could have dreamed."

Launched on February 11th 2010 from Cape Canaveral, the observatory has spent the past two months moving into a geosynchronous orbit and activating its instruments. As soon as SDO's telescope doors opened, the spacecraft began beaming back scenes so beautiful and puzzlingly complex that even seasoned observers were stunned.

- ◆ August 2010 newsletter, page 7.
- ◆ [http://science.nasa.gov/science-news/science-at-nasa/2010/21apr\\_firstlight/](http://science.nasa.gov/science-news/science-at-nasa/2010/21apr_firstlight/)

### Basics: the sidereal, tropical and anomalistic year - by Pierre Lourens

The figures are as seen from above the north pole of Earth.

The **sidereal year** is the time taken for the Earth to make one complete revolution of the celestial sphere as seen from the centre of the Sun. It can also be considered to be the time taken for the Sun (as seen from the center of the Earth) to make one complete revolution on the celestial sphere with reference to a fixed point P on the celestial sphere. (See figure 1.) Its length is 365d 6h 9m 10s (365.25636d) of mean solar time.

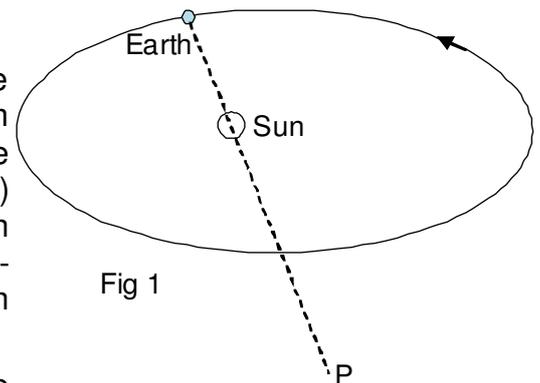


Fig 1

The **tropical (or equinoctial) year** is the time taken for the Sun to make one complete revolution along the ecliptic with reference to the vernal equinox (of the northern hemisphere). Its length is 365d 5h 48m 46s (365.24220d) of mean solar time. The reason why the tropical year is shorter than the sidereal year is the westward movement of the equinox along the ecliptic. (See the August 2010 newsletter, page 10.) In figure 2, the vernal equinox moves from point P1 on the celestial sphere to point P2 on it during the time the Earth moves from point 1 around the Sun to point 2. The tropical year is also the year to which the calendar conforms as nearly as possible.

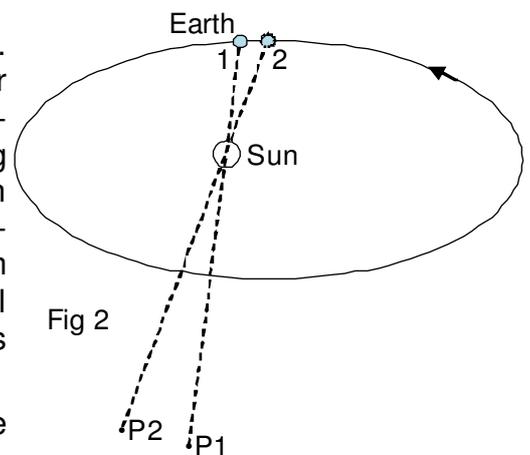


Fig 2

But why is it called the **tropical** year? This year can also be defined as the time taken for the Sun to move along the ecliptic from one summer solstice (of the northern hemisphere) to the next. Remember that as the Earth's axis precesses, both the solstices and the equinoxes undergo motions corresponding with those of the Earth's axis. The summer solstice undergoes exactly the same westward shift along the ecliptic as the vernal equinox. (See the August 2010 newsletter, page 10.) When the Sun reaches the summer solstice, the diurnal apparent path of the Sun through the sky (because of the rotation of Earth) turns around. The word "**tropical**" comes from the Greek word **tropikos** meaning "**turn**". So the **tropical** year is the time from one **turn** of the Sun to its next **turn**.

The **anomalistic year** is the time taken between successive passages of the Earth through perihelion. Its length is 365d 6h 13m 52s (365.25964d) of mean solar time. The reason why the anomalistic year is longer than the sidereal year is that, strictly speaking, the Earth's orbit around the Sun is not closed: the long axis of the Earth's orbit rotates in the plane of the ecliptic in the same direction as the revolution of the Earth around the Sun. The perihelion of the Earth's orbit therefore advances in the same direction as the revolution of the Earth around the Sun. But the perihelion advance of the Earth's orbit is exceedingly small: calculated with general relativity theory, its value is 3.8364 arc seconds/century ( = 0.000010657 degrees/year).

## The James Webb Space Telescope and progress with it

The James Webb Space Telescope (JWST) will be NASA's next orbiting observatory and the successor to the Hubble Space Telescope. The JWST will be an infrared telescope orbiting at Lagrange point L2.

Infrared vision is vital to our understanding of the Universe. The furthest objects we can detect are seen in infrared light, cooler objects that would otherwise be invisible emit infrared light, and infrared light pierces clouds of dust, allowing us to see into their depths. Webb will unleash a torrent of new discoveries, opening the door to a part of the Universe that has just begun to take shape under humanity's observations. Supernovae and black holes, baby galaxies and planets' potential for supporting life - the JWST will help reveal the answers to some of the biggest mysteries of astronomy.

Right now, scientists and engineers are piecing Webb together, creating through cutting-edge technology an innovative observatory that not only withstands intense cold, but uses it to its advantage - an observatory that folds up inside a rocket for launch and unfurls like a butterfly opening its wings upon nearing its orbit. The JWST will be launched into space in 2014.

- The JWST: Newsletter for June 2007, page 6.
- Progress with the JWST: [http://webbtelescope.org/webb\\_telescope/](http://webbtelescope.org/webb_telescope/)

## Advancing telescopes

On the right is shown the altitude track of the alt-az mounting of the Large Binocular Telescope on Mount Graham in the Pinaleno Mountains of southeastern Arizona, USA. It has two mirrors, each with diameter 8.4 meters, which gives it the same total optical area as a single mirror with diameter 11.8 meters.

Galileo Galilei would surely have been astounded if he could have seen how much more advanced this telescope is than the one he used!

As telescopes advance, so does our knowledge of the Universe. Follow the leaps in understanding propelled by advancing telescope technology at

[http://hubblesite.org/explore\\_astronomy/piercing\\_the\\_sky/](http://hubblesite.org/explore_astronomy/piercing_the_sky/)

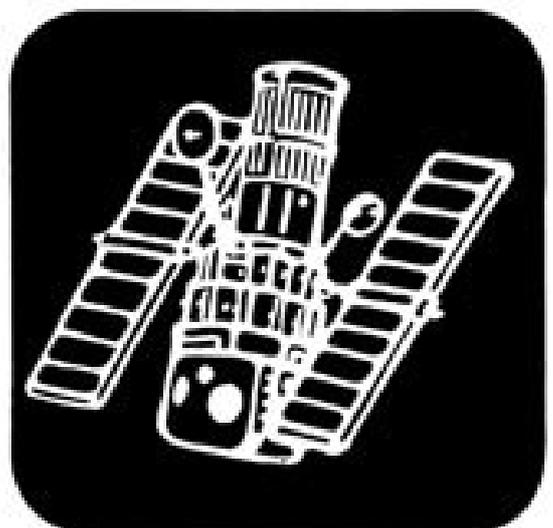


## Bring the HST to your computer screen

Bring the power of the Hubble Space Telescope (HST) to your computer screen, browsing the Universe for astronomical phenomena in striking detail. Hubble images in full resolution are now available through Microsoft Research's free WorldWide Telescope (WWT) software. Pan across the constellations to find objects of interest and zoom in for close-ups, or zoom out for context. Hear professional Hubble astronomers explain the stories, science and significance of the objects in guided tours, or make your own tours to share with the public. WorldWide Telescope includes not only Hubble images, but a rich collection of visuals from both ground and space telescopes in visible light, infrared, x-ray, radio and other wavelengths.

The Universe in its full glory is yours to explore.

[http://hubblesite.org/explore\\_astronomy/wwt/](http://hubblesite.org/explore_astronomy/wwt/)



## The Rosette Nebula

The false colour image (below) is from the European Space Agency's Herschel orbiting telescope. Protostars shine in their dusty shrouds in the molecular cloud associated with the Rosette Nebula. This nebula is about 4 500 light-years away in the direction of the southern constellation Monoceros, which is close to the celestial equator. (Monoceros is Greek for unicorn.) **The nebula is bright enough to be visible through small telescopes.** It occupies several times as much of the sky as the full moon.

The Herschel telescope, built in conjunction with NASA and launched in May 2009, boasts the largest telescope mirror ever launched into space: 3.5 m in diameter.

Like NASA's James Webb Space Telescope, set to be launched in 2014 with an even larger 6.5-meter mirror, Herschel collects infrared light. Visibility in that range of the electromagnetic spectrum, which is greatly reduced on Earth due to atmospheric absorption, allows the observatory to peer at stars being created inside dusty molecular clouds. At the time of its launch, an astronomer said that Herschel's infrared view of star birth would be "analogous to using ultrasound to see what is going on in a mother's womb."

<http://www.esa.int/SPECIALS/Herschel/index.html>

This information was sent in by Dr Adam Viljoen, a member of the Pretoria Centre of the ASSA.





### Head-on collision between two asteroids

Something awfully curious is happening 160 million kilometers from Earth in the asteroid belt. There's a newly discovered object that superficially looks like a comet but lives among the asteroids. The distinction? Comets swoop along elliptical orbits close in to the Sun and grow long gaseous and dusty tails, as ices near the surface turn into vapor and release dust. But asteroids are mostly in circular orbits in the asteroid belt and are not normally expected to be "volatile."

The mystery object was discovered on January 6, 2010, by the Lincoln Near-Earth Asteroid Research (LINEAR) sky survey. The object appears so unusual in ground-based telescopic images that discretionary time on NASA's Hubble Space Telescope was used to take a close-up look. The observations show a bizarre X-pattern of filamentary structures near the point-like nucleus of the object and trailing streamers of dust. This complex structure suggests the object is not a comet but instead the product of a head-on collision between two asteroids traveling five times faster than a rifle bullet. Astronomers have long thought that the asteroid belt is being ground down through collisions, but such a smashup has never before been seen.



At top left are actual images of the object and at top right is an artist's representation of a collision of two asteroids.

<http://hubblesite.org/newscenter/archive/releases/2010/07/full/>

### Hubble catches end of star-making party in nearby dwarf galaxy

Galaxies throughout the universe are ablaze with star birth. But for a nearby, small spiral galaxy, the star-making party is almost over. The celebration is confined to a few die-hard party-goers huddled in the galaxy's inner region. The explanation, astronomers say, is that a raucous interaction with the neighboring M81 group of galaxies ignited star birth in NGC 2976. Now the star-making fun is beginning to end.

Images from NASA's Hubble Space Telescope show that star formation in the galaxy began fizzling out in its outskirts about 500 million years ago as some of the gas was stripped away and the rest collapsed toward the center. With no gas left to fuel the party, more and more regions of the galaxy are taking a much-needed nap. The star-making region is now confined to about 5,000 light-years around the core.

<http://hubblesite.org/newscenter/archive/releases/2010/05/full/>

### Neutron star crust is stronger than steel

Neutron stars are dead relics that have collapsed into very small, dense spheres with tough crusts. Forces welling from within can crack the crusts during events called star quakes, similar to earthquakes. The awesome power of those quakes can blast gamma rays into space, leading scientists to suspect that the stars' crusts must be very hard to break.

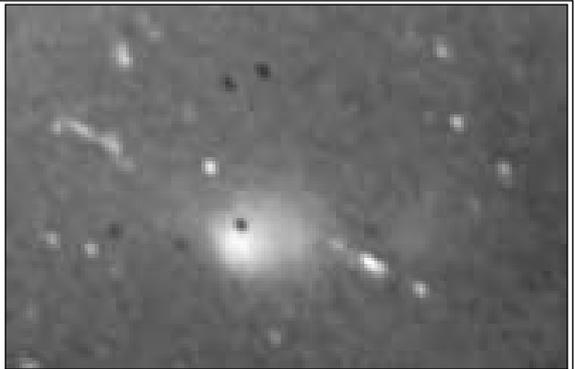
A new study suggests how strong they are: The crust of neutron stars could be 10 billion times stronger than steel, based on an innovative model of elements compressed as tightly as they would be on the surface of a neutron star.

<http://www.space.com/scienceastronomy/090518-mm-star-crust.html>

## Powerful lightning at Saturn revealed in video

NASA's Cassini spacecraft captured images of lightning at Saturn that allowed scientists to create the first movie showing lightning flashing on another planet.

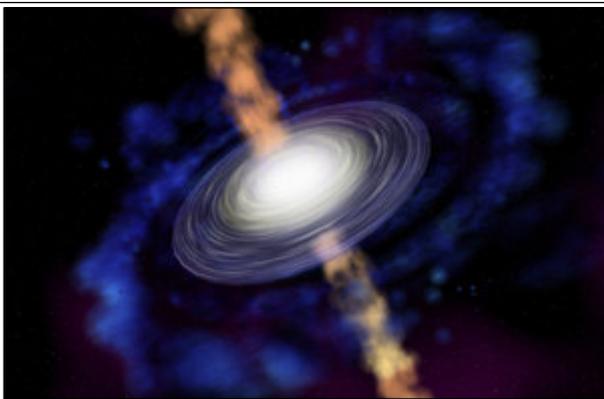
"The visible light images tell us a lot about the lightning," said a Cassini imaging team associate. "Now we can begin to measure how powerful these storms are, where they form in the cloud layer and how the optical intensity relates to the total energy of the thunderstorms."



After waiting years for Saturn to dim enough for the spacecraft's cameras to be able to detect bursts of light, scientists were able to create the movie, complete with an accompanying soundtrack that features the crackle of radio waves emitted when lightning bolts strike.

The image shows lightning flashes on Saturn. See the video at:

<http://www.space.com/scienceastronomy/cassini-saturn-lightning-100415.html>



## Jets are a real drag

This artist's concept shows a still-forming protostar which is accreting material from a surrounding disk. Some of the material from the disk, rather than falling onto the star, is ejected outward in a bipolar jet. New measurements from the Sub millimeter Array show that matter in the jet is rotating around the jet's axis in a sort of 'reverse whirlpool,' which carries angular momentum away from the system and helps the star grow.

<http://www.sciencecentric.com/news/07122602-jets-are-real-drag.html>

## Two supernovae at the edge of the Universe

Cosmologists from the University of California - Irvine have found two supernovae farther away than any previously detected by using a new technique that could help find other dying stars at the edge of the Universe. The supernovae occurred 11 billion years ago. The next-farthest large supernova known occurred about 6 billion years ago.

<http://www.sciencecentric.com/news/09070848-two-supernovae-at-the-edge-the-universe.html>

## Phoenix sees falling snow on Mars

NASA's Phoenix spacecraft has detected snow falling from Martian clouds. A laser instrument designed to gather knowledge of how the atmosphere and surface interact on Mars has detected snow from clouds about 4 kilometers above the spacecraft's landing site. Data show the snow vapourising before reaching the ground. 'Nothing like this view has ever been seen on Mars,' said the lead scientist for the Meteorological Station on Phoenix. 'We'll be looking for signs that the snow may even reach the ground.'

<http://www.sciencecentric.com/news/08092907-phoenix-sees-falling-snow-on-mars.html>

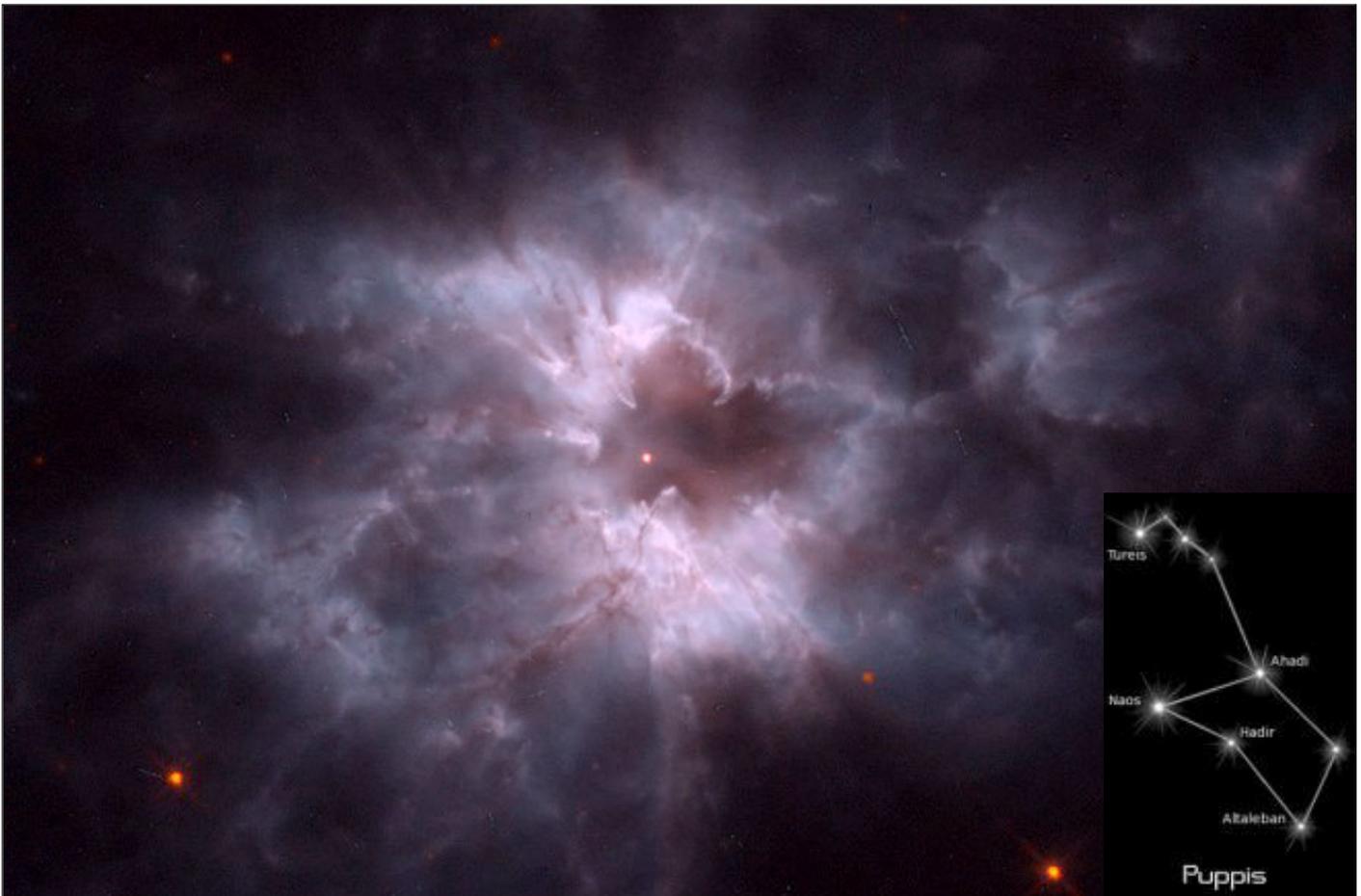
## Introduction to double stars

Lucas Ferreira has published an "Introduction to Double Stars", which provides a gentle introduction to what double stars are and how you can observe them.

<http://www.sao.ac.za/assa/sections/doublestars/DoubleStarIntro ASSA 1.0.pdf>

**NGC 2440: Cocoon of a new white dwarf**

Like a butterfly, a white dwarf star begins its life by casting off a cocoon that enclosed its former self. The cocoon is the planetary nebula designated NGC 2440. It is situated in the southern constellation Puppis (Latin for poop deck of a ship) and is 4000 light-years away. It contains one of the hottest white dwarf stars known. The white dwarf can be seen as the bright dot near the photo's center. Our Sun will eventually become a white dwarf butterfly. (This false colour image was post-processed.) <http://antwrp.gsfc.nasa.gov/apod/ap100221.html>



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