



The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER FEBRUARY 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 24 February 2010 at 19h15.

Programme:

Beginner's Corner: "The Stevick Paul telescope" by Fred Oosthuizen

What's Up in the Sky: by Percy Jacobs

10 minute break — library will be open

Main talk: "Astro-archaeology" - by Richard Wade

Tea/coffee and biscuits.

The chairperson at the meeting will be Gareth Gregory.

The next observing evening will be held on Friday 19 February 2010 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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Chairman's report of last month's meeting – by Percy Jacobs

Well, what a surprise to the start off the New Year. We had a record attendance. 65 people attended - 27 visitors and 38 members. Hopefully this was due to the interest in Astronomy & the Pretoria Centre and not only as a result of our popular guest speaker, Professor David Block.

Beginner's corner was presented by Danie Barnardo on the Pretoria Centre Library. Danie, with the help of others, has developed a software data base whereby all the books in our library have been electronically loaded into the data base for quick and easy reference and searching. Danie gave us a quick tour of the data base. At a later stage, the data base shall be accessible via our web page. Target date set by Danie for this is before year end. This is certainly a first and shall make the books in our library more accessible. Well done to Danie and the team.

What's up was presented by myself. Of the good targets for the month, Mars is in a good position showing off some well defined surface features easily seen through a 6" scope. The Meteor Shower, Alpha Centaurids, in Centauris in the southern part of our sky, with the peak on the 7th Feb, is also a good target.

Our main speaker, Professor David Block, presented his book "Shrouds of the Night" which was co-authored by Ken Freeman. The book was launched in 2009, the IYA.

Professor Block explained how early astronomers, using simple oil lanterns, made with special glass, produced a dim orange / red glow, could observe and make detailed sketches of their observations without effect on their scotopic vision at night. They sketched the "shrouds". As we know, red light has the least effect on our night vision enabling us to read our star maps and observe without effect on scopic vision. Some of the impressive early sketches using these lanterns were shown to us. It's amazing to see the precise detail in these sketches when compared to the latest photographic pictures.

He also explained how he and his team at Wits University found the hidden Universe behind the mask. We need to remove the misty, dusty masks of the Universe, the "skin" of the Universe, to see what's behind. Similar to the human body, X-Rays allow us to remove our outer skin layer (the mask) and see our spin in detail behind. By removing the mask, using infrared technology, we are able to observe the back bone of the Universe. He and his team at Wits University clearly proved this by discovering the galaxy collision in the Andromeda Galaxy. Their research was published in the world's most prestigious scientific journal "Nature".

The meeting ended off with general chat over tea & coffee.

Last month's observing evening - by Michael Poll, Johan Smit, Percy Jacobs, Danie Barnardo

Broken cloud on this evening, so we were able to do some observing. About 30-40 people were there and about eight telescopes. There were a number of visitors, some of them brought their own scopes, including Bill Reynard from Johannesburg.

It stays light quite late at this time of year, so during what remained of the daylight, we were able to look at the moon, and we observed it well into twilight. The phase exactly matched the picture on Page 58 of the 2010 Sky Guide. Several of us spent time identifying and naming various craters, including Hipparchus and Albategnius, and the Alpine Valley was an impressive sight. Also something that can be seen in the photograph on Page 58, underneath the line joining the figure "20" to the crater it points to (Werner) there is a cross (X), which appears to be created by the particular illumination of the rims of two other craters. These craters are tentatively identified (retrospectively by MP) as the craters Blanchinus and Purbach. We were intrigued by this feature on the Moon. Another crater we saw was Horrocks, (No 17 on Page 58), which is superimposed on Hipparchus. Jeremiah Horrocks (1618 -1641) predicted the 1639 transit of Venus, and was one of only two people to observe it – the other person was Horrocks' friend, William Crabtree. (Continued on next page.)

The crater Werner was named after Johannes Werner (1468-1528), a German astronomer; the crater Blanchinus after Giovanni Bianchini, who lived around 1458 and was an Italian teacher of astronomy; and Purbach after Georg van Peurbach, (1423-1461), an Austrian astronomer.

We started spotting the stars as they came out, and we had what was probably a last look at Jupiter for this season. Jupiter was quite low down in the western twilight. All four moons were visible, with Io very close to the limb. Io was due to be occulted by the planet about 20 minutes after we first noted Jupiter, but the event was not seen, due to low altitude and cloud.

The northern sky received most attention during the evening. The moon was there of course, and Orion was well up, and was used in the usual way as a signpost to show newcomers how to find Aldebaran and the Pleiades in Taurus, and Sirius and the rest of Canis Major. We could see yellowish Capella just above the northern horizon, and its colour contrasted nicely with the colours of Rigel and Betelgeuse. The Pleiades were a nice sight for those who had not seen them before through a telescope, in spite of their being somewhat washed out by the moon.

Danie arrived early in the evening and said he had three objects to find. All three were located, and were very impressive. The first object was a double star in Canis Major, designated 145 CMa and is known as the "winter" Albireo (northern hemisphere winter - in our case "summer"!).

145 CMa is a colourful double and is very similar to its name sake, Albireo (Beta Cygni). (145 CMa is also designated as "h3945", and is labelled as such in Norton's Star Atlas. The lower case "h" in the label refers to Sir John Herschel, who was the discoverer. An upper case "H" would refer to Sir John's father, Sir William).

A second object was Sigma Orionis, an impressive multiple star system just south of Orion's Belt ("above" the Belt as seen from our latitude). The nearest Belt star is Alnitak (Zeta (ζ) Orionis). Sigma is a five star system and is approximately 1,150 light years from Earth. The third object was Beta Monocerotis, an impressive triple system, which is located between Orion and Canis Major, and is the second brightest star in the constellation of Monoceros, the Unicorn.

The cloud came in later, so it was disappointing not to have been able to have a look at Mars. By about 9.30 pm it had clouded in completely so we called it a night, but we were pleased nevertheless to have at last been able to do some observing on our Observing Evening! The next observing evening is on February 19th 2010, when Mars will still be available, and Saturn will be up later in the evening.

Also on our next observing evening, there will be a chance to see the asteroid 4 Vesta, which reaches opposition on February 18th, near Gamma Leonis. Gamma is a telescopic double, but there is another star, 40 Leonis, close to Gamma. Gamma and 40 make a binocular double. Around the opposition date, Vesta will pass *between*(!) these two stars, and, at magnitude 6.3, Vesta should be visible in binoculars. The asteroid will still be near Gamma Leonis on our observing evening. (See: *Sky and Telescope*, February 2010 page 54).

Newsletter distribution from 1 July 2010

Sending newsletters by post has become very expensive and creates a large workload for the members of the committee.

To solve these problems the committee is considering sending out newsletters **by e-mail only**, from the start of the next financial year on 1 July 2010. With your membership renewal in June/July 2010 make sure that you provide an e-mail address to ensure that you continue to receive your newsletter. We will still require a postal address for distribution of the Sky Guides.

We understand that there may be members who do not have access to e-mail and invite these members to contact the committee as soon as possible. We want to see how many members are adversely affected and if a suitable alternative delivery method can be found. An option would be that printed newsletters will be available to be collected at our monthly meetings.

Note that the e-mailed newsletter is in full color, whereas the printed newsletter is in black and white.

Saturn's Moon, Enceladus – Part 2. By Michael Poll

The NASA Cassini mission arrived at Saturn in July 2004. There have been a number of flybys of Enceladus, at distances ranging from 150 000 km to as little 50 km above the surface.

Enceladus is geologically extremely active, with water rich geysers that shoot hundreds of kilometres into space. Previously it did not seem possible that object so small (500 km) could show so much activity.

A pass of Enceladus by Cassini in May 2005 revealed four long parallel fissures in the south polar region - the "Tiger Stripes" (Figure 4). Later observations showed that these are low ridges with a central fracture, or fissure, and they have been called "sulci" (singular "sulcus", from the Latin, a groove or furrow). The sulci are named for Damascus, Alexandria, Cairo, and Baghdad. These sulci are about 130 km long, about 2 km wide, about 300 – 500 metres deep and about 35 km apart. The flanking ridges are about 100 metres high. It is possible that the sulci may be formed by crustal spreading, much like the spreading ridges on the ocean floors of the Earth. This type of tectonic activity would explain the apparent youth of the south polar terrain.

By mid 2005 it was known from observations by Cassini that a watery atmosphere originates from the sulci, where geysers spray out plumes consisting of gas and particles. The definitive image of the plumes was obtained in November 2005 (Figure 5). The *Gas* from the geysers is 92% water vapour, the rest is carbon dioxide, nitrogen, ammonia, and also there are traces of hydrocarbons, including methane, propane and acetylene. The *Particles* are primarily ice dust. The gas is ejected at hundreds of metres per second, and so is moving faster than Enceladus' escape velocity of 240 metres per second (860 km/ hour). The gas escapes into space, and it is this gas that populates the E ring. The ice particles have a lower velocity, so they fall back to the surface, giving the snowy appearance.

One force that may be driving the plumes is that of boiling water. The venting regions in the sulci are relatively hot, at about 145 Kelvin, which is about 60 Kelvin warmer than expected. This temperature is too low for ice to melt at the surface, (the temperature would need to be higher, at 170 Kelvin), but considering that temperature generally increases with depth, there could be liquid water even 40 meters down, and it is mechanically possible for this water to boil and drive the plumes.

Another possibility is that the plumes are driven by a force that does not require near-surface water - they may be created by the explosive decomposition of clathrate. Clathrate is a form of ice that has many spaces in its crystal lattice, allowing it to hold up to 10% by weight of the other, more volatile, gases that have been detected in the plumes. If tidal flexure caused the sulci to open and close during the course of an orbit of Saturn, new cracks would expose the clathrates to the vacuum of space, causing an explosion which would drive out gas and particles at high speed.

Enceladus would have lost about 20% of its mass if it has been venting at its current rate since solar system formed, and the fact that it is much denser than either Mimas or Tethys, suggests that this is the case - the overall density has increased due to the loss of lower density water ice, leaving material of a higher density behind.

Enceladus is very small but has lots of heat, and it is likely there is liquid water much deeper down, below the source of plume activity. Enceladus could have either global ocean or a localized south polar layer of water.

How does Enceladus generate its internal heat?

Enceladus is in a mean motion orbital resonance of 2:1 resonance with Dione, the next satellite out. Enceladus orbits Saturn twice to once for Dione. The resonance causes tidal flexing of Enceladus, which provides a heating source for its geologic activity. It is estimated that the flexing could generate 100 megawatts of power, which is about one tenth that of a nuclear power station. On planetary scales this is not a lot, but it could be enough to drive slow convective flows

and maintain the liquid ocean.

The scenario of a sub-surface ocean has been proposed for other moons of the outer planets, notably Jupiter's moon Europa. So, with possible liquid water, heat, organic chemicals and active chemistry Enceladus contains the ingredients for life. Because of this, the idea of future missions to visit and further investigate Enceladus has been suggested.

References

- Zooming in on Enceladus' cracks. News Note, Sky and Telescope, November 2008 p 19.
- What's going on in Enceladus? News Note, Sky and Telescope, August 2009 p 16.
- Ice Worlds of the Ringed Planet. Emily Lakdawalla Sky and Telescope, June 2009 p 26.
- Enceladus – A temporary briny deep. News Note, Sky and Telescope, October 2009 p 14.
- Wikipedia.

Figure 4

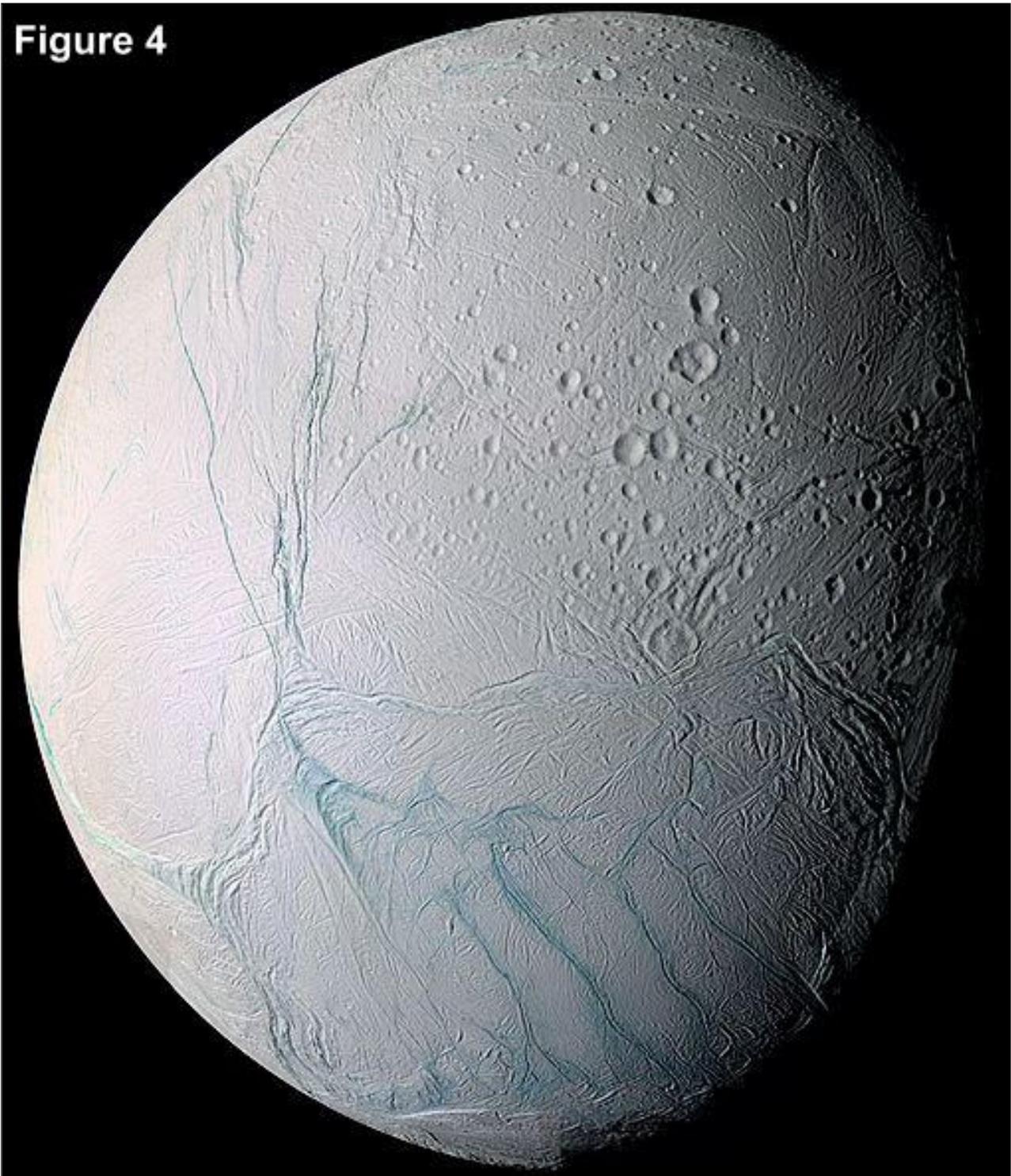
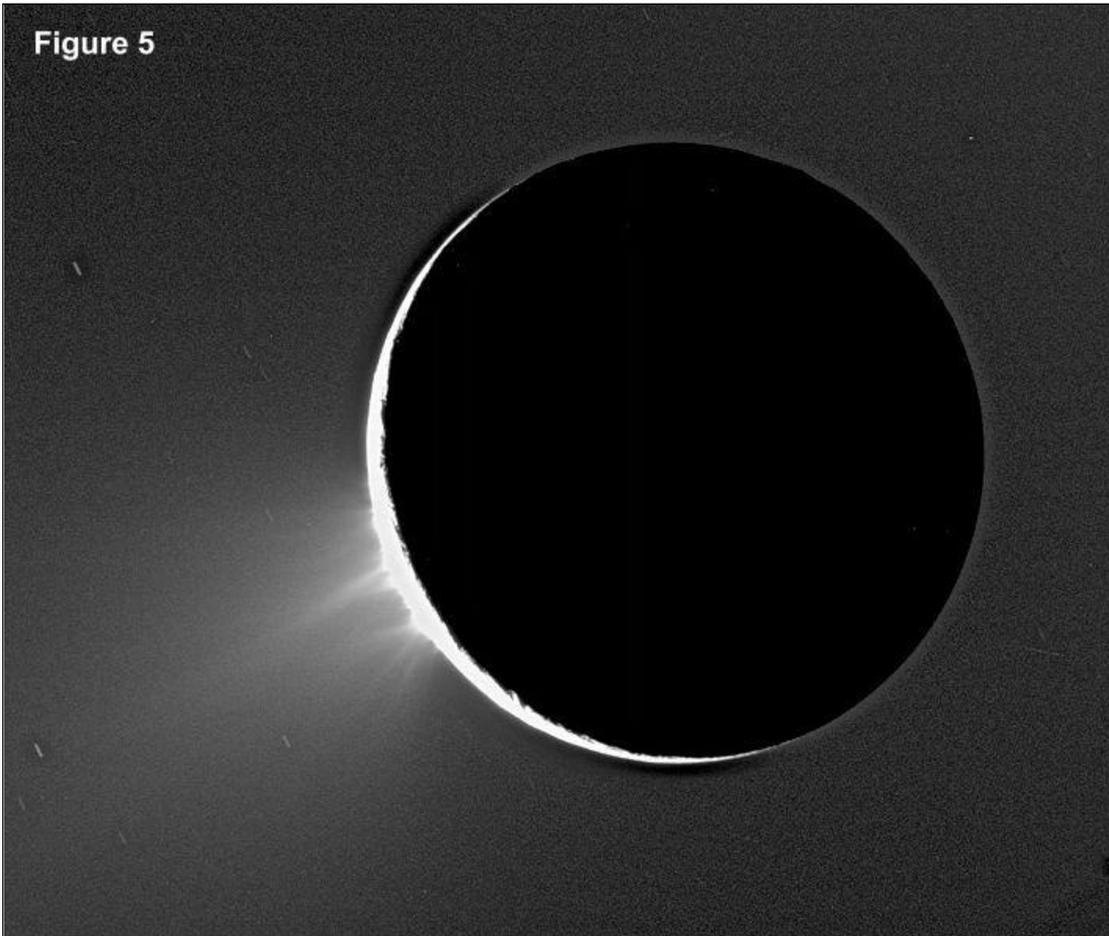


Figure 5



Hennie Maas se sterrekundeprogram

Hennie Maas bied 'n sterrekundeprogram genaamd “**Sterre en Planete**” aan op Donderdaagde vanaf 20h30 tot 21h00 op Radio Sonder Grense (RSG).

Lede kan gerus daarna luister. Hier is ook 'n kans vir lede van die Pretoria Sentrum van die ASSA om self deel te neem aan die program en sterrekunde na die publiek te bring. En dit nogal in Afrikaans. 'n Lid van die Pretoria Sentrum, Wayne Mitchell, het al deelgeneem aan 'n soortgelyke program op Bosveld Stereo.

Die webskakel na Hennie Maas se persoonlike webruimte is

http://www.rsg.co.za/aanbieders_webwerwe.asp?id=9

Astronomy jokes

How do astronomers do it?

- Astronomers do it all night.
- Astronomers do it elliptically.
- Astronomers do it hyperbolically.
- Astronomers do it parabolically.
- Astronomers do it on mountain tops.
- Astronomers do it in clusters.
- Astronomers do it under the stars.
- Astronomers do it in the dark.
- Astronomers do it with long tubes.
- Astronomers do it with mirrors.
- Astronomers do it with young stars.
- Astronomers even do it with old stars that flare up repeatedly.





Maan

Links: 'n Foto van die enigste maan wat wentel om die derde planeet vanaf die Son. Die foto is geneem deur Danie Barnardo op 27 Desember 2009.



Solar eclipse

A photograph of the solar eclipse of January 2010 taken over Jiangsu Province, China. Such an event is known as an annular eclipse, because a bright annulus—or ring—of sunlight remains visible even when the moon is directly between Earth and the Sun.

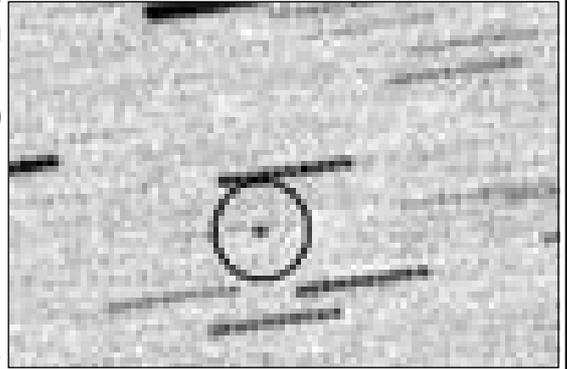
The moon's orbit is not a perfect circle, which means its exact distance from Earth changes. During an annular eclipse, the moon is farther from Earth, so its apparent size is smaller than the visible disk of the Sun.

<http://news.nationalgeographic.com/news/2010/01/photogalleries/100115-eclipse-ring-fire-annular-pictures/#025632> 600x450.jpg

Klein asteroïedes beweeg naby die aarde verby

Twee klein asteroïedes het in Januarie vanjaar naby die aarde verby beweeg. (D = afstand tussen die maan en die aarde = 400 000 kilometers.)

- 2010 AL30 is sowat 11 meters in deursnit en het 130 000 kilometers (= $(1/3)D$) vanaf die aarde verby beweeg.
- 2010 AG30 is sowat 13 meters in deursnit en het 1 000 000 kilometers (= $(2.5)D$) vanaf die aarde verby beweeg.



Daar is sterrekundiges wat konstant op die uitkyk is vir komete en asteroïedes wat moontlik die aarde kan tref.

Die meegaande beeld is 'n foto van 2010 AL30 en is geneem op 11 Januarie 2010, toe dit ontdek is deur sterrekundiges by die Skylive-Grove Creek Observatory in Australië.

Daar beweeg gereeld asteroïedes van verskillende groottes naby die aarde verby. Bogenoemde was maar net twee van die kleintjies

- Sien die webruimte by die volgende webskakel en ander webskakels daar:
<http://www.space.com/scienceastronomy/weird-space-object-asteroid-100112.html>
- Sien ons Sentrum se nuusbriëf vir Oktober 2004, bladsye 4 en 5, oor asteroïede Toutatis.

Panel calls for global "asteroid defence agency"



The world should organise its defences now in case an asteroid is found on a collision course with Earth, says a group of US scientists. There are huge numbers of asteroids that come close to Earth's orbit, called near-Earth asteroids (NEAs). Many of them are large enough to do serious damage in an impact, including the asteroid Apophis, which has a small chance of hitting Earth in 2036.

A US National Research Council panel led by Irwin Shapiro of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts, issued a report on how best to respond to the asteroid threat.

It recommended setting up an international body that would be prepared to spring into action and defend the planet if an asteroid is discovered on a likely impact course. The international body would be "composed of representatives of nations concerned with this problem and willing to invest in preparedness for a damaging collision", the report says. If a dangerous asteroid were discovered far enough in advance, the group could organize a space mission to deflect it.

Asteroid Eros, as seen by NASA's spacecraft NEAR, is shown here. It is 33 kilometers wide, making it the second largest near-Earth asteroid.

<http://www.newscientist.com/article/dn18426-panel-calls-for-global-asteroid-defence-agency.html>

New Pluto pictures unveiled - Hubble's sharpest yet

Swaths of white, dark orange, and charcoal gray dance across the surface of Pluto in the sharpest view yet of the dwarf planet, made possible by pictures from the Hubble Space Telescope. The pictures reveal that Pluto is a much more dynamic body than commonly thought, and they offer astronomers ideas of what to focus on when the New Horizons spacecraft reaches the dwarf planet in 2015. See the images on the following website:

<http://news.nationalgeographic.com/news/2010/02/100204-pluto-hubble-best-pictures/>

But the best Pluto images will likely come from New Horizons. Launched in January 2006, the craft is more than halfway to Pluto and is due to be the first spacecraft to orbit the dwarf planet, offering new insights into the largely mysterious objects that exist in the Kuiper belt.

http://www.nasa.gov/mission_pages/newhorizons/main/index.html

<http://pluto.jhuapl.edu/>

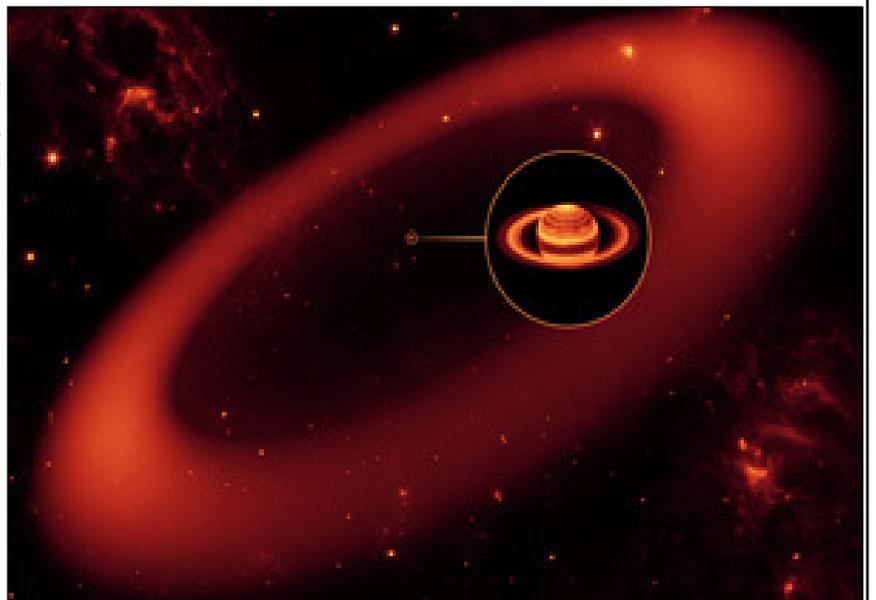
Below is an artist's conception of the New Horizons spacecraft during its planned future encounter with Pluto and its moons. The distant Sun is shown in the background.



Spitzer discovers an enormous ring around Saturn

NASA's Spitzer Space Telescope has discovered an enormous ring around Saturn - by far the largest of the giant planet's many rings. The new belt lies at the far reaches of the Saturnian system, with an orbit tilted 27 degrees from the main ring plane. The bulk of its material starts about six million kilometers away from the planet and extends outward roughly another 12 million kilometers.

This artist's conception shows a nearly invisible ring around Saturn - the largest of the giant planet's many rings.



<http://www.sciencecentric.com/news/article.php?q=09100801-spitzer-discovers-an-enormous-ring-around-saturn>

Question: What's the most popular snack on Mars? **Answer:** Marshmallows.

Summary of “What’s Up in the Sky?” to be presented on 24 February by Percy Jacobs

Phases of the Moon

Full Moon – 30th Mar 10 (rises 18:11, sets 06:25)
 Last Quarter – 7th Mar 10 (rises 23:27, sets 12:52)
 New Moon – 15th Mar 10 (rises 05:38, sets 17:58)
 First Quarter – 23rd Mar 10 (rises 13:10, sets 23:50)
 Dark Sky – from about 7th Mar to 22nd Mar
 Thin crescent moon can be seen on 20th with the Pleiades just above

Planets

Mercury mag. -0.7
 best seen early March – about hour before sunrise – in the east

Venus mag. -3.9
 visible ½ hr after sunset – in the west

Mars mag. -0.6
 can be seen from sunset in the north east until about 02:00 in west
 becoming dimmer – last chance to see some clear detail is early March

Jupiter not seen in March

Saturn mag. 0.6
 visible the whole month from about 19:30

Uranus mag. 5.9
 cannot be seen in March

Neptune mag. 8.0
 visible for about hr before sunrise in east

Events

Meteor Showers

Gamma Normids - Mar 13th – listed as favourable – 8 per hr – 00:00 to 04:30

Vernal Equinox

- 20th March - southern autumn begins
 - Sun passes directly over the equator. At these times, periods of daylight and night time, are of virtually the same length all over the globe.

Constellations – shall be discussed in more detail at meeting

Most of the constellations mentioned in Feb’s What’s Up”, can still be seen early March

New Constellations for March

Leo - “ID” stars - Regulus - in the east
 Virgo - “ID” stars - Spica - in the east
 Southern Cross
 Centaurus - “ID stars” - alpha & beta Centauri
 Corvus - “ID stars” - delta Corvi (mag. 3)(double star)
 Vela

- <http://www.saao.ac.za/public-info/sun-moon-stars/>
- <http://www2.jpl.nasa.gov/calendar/>
- <http://www.skyandtelescope.com/observing/highlights/19981449.html>
- Sky Guide Africa South 2010.

Golf shirts

Golf shirts with the logo of our Centre on it, can still be ordered from Pat Kühn, one of our committee members. You will have the last opportunity to do it at our next meeting on 24 February.

Amerikaanse president se begroting vir NASA vir die volgende 5 jaar

<http://www.universetoday.com/2010/02/01/nasa-budget-details-constellation-cancelled-but-where-to-next/>



Second Karoo Star Party

The ASSA Pretoria Centre wants to hold its second National Karoo Star Party during the long weekend of 6 to 9 August 2010 about 20 km north of Britstown in the Karoo, right next to the N12 at the Kambro Padstal. The reason for this locality, apart from the fabulous Karoo skies, is that it is almost exactly halfway between Gauteng and the Cape Town area, so we can all drive the same distance to the site. The first event of this type was held during April 2009 and proved to be a big success. The Karoo lived up to its reputation and provided magnificent views to those lucky enough to be present.

More information from:

- [Johan Smit](mailto:JohanS@firsttech.co.za), cellphone: 0728062939, e-mail: JohanS@firsttech.co.za
- [Danie Barnardo](mailto:daniebar@telkomsa.net), cellphone: 0845886668, e-mail: daniebar@telkomsa.net

To book, please contact Wilma Strauss, the Manager of Kambro directly at 0833056668 or at e-mail: kambro@worldonline.co.za. You can also view their website (with a report on the star party that took place last year) at: <http://www.kambroaccom.co.za/>



Spirit stuck in sand pit

The Mars robot rover Spirit is stuck in a sand pit on Mars. NASA Engineers are trying to get it out. If Spirit is declared stuck it will remain an operational science station, just no longer mobile. Fortunately, it is in a scientifically exciting place. It still could have a lot of work to do at that site.

Image at left: Spirit imaged a pile of rocks named the "rock garden" where it got stuck after driving a few feet further. One of these rocks is pointed against the rover belly now. The Von Braun volcanic cone with capped top is ahead. It is Spirit's next objective, should it break free.

<http://spaceflightnow.com/news/n0911/16spirit/>

Dark Sky weekend at Goodlands estate

DATE: 12/13 March 2010

COST: R125.00 pppn en-suite chalets. There are 4 chalets with 2 single beds in each.

R70.00 pppn sleeping on mattresses on the floor in main hall.

R40.00 pppn camping / caravanning.

Bring own bedding, pillows, towels, eating utensils and a pot or two.

Braai grid, firewood, fridge/deepfreeze, 5 plate gas-stove, hot water and wash up area in main kitchen provided.

For bookings and further information contact Fred Oosthuizen on Cell 072 373 2865, landline 012 346 2761 or e-mail fredo@mweb.co.za.

Goodlands estate is nestled in the peaceful Seringveld Conservancy 45 km from Pretoria and 15 km from Cullinan. The setting provides the perfect place to break away from the city life and enjoy the outdoors. Set on 270 Hectares of bushveld with hills, valley and perennial stream and night sky's unpolluted by lights or smog. IDEAL FOR ASTRONOMY.

Barnard's galaxy

In this new ESO image, NGC 6822 (a.k.a. "Barnard's galaxy") glows behind a sea of foreground stars in the direction of the constellation of Sagittarius (the Archer). At the relatively close distance of about 1.6 million light-years, it is a member of the Local Group, the group of galaxies that includes our home galaxy, the Milky Way. NGC 6822 is an irregular dwarf galaxy and contains about 10 million stars. The nickname "Barnard's galaxy" for it comes from its discoverer, the American astronomer Edward Emerson Barnard, who first spied this visually elusive galaxy in 1884, using a 125-millimetre aperture refractor.

<http://www.sciencecentric.com/news/article.php?q=09101426-the-milky-way-tiny-but-tough-galactic-neighbour>



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