



# The PRETORIA CENTRE

of the

## Astronomical Society of Southern Africa

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

### NEWSLETTER MARCH 2011

#### Next meeting

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

**Date and time:** Wednesday 23 March at 19h15.

**Programme:**

- **What's Up?** by Michael Poll
- **Beginner's Corner:** "A miscellany: further discussion of topics raised in "What's Up?" " by Michael Poll
- 10 minute break — library will be open
- **Main talk: "Space Science in South Africa"**  
**by Dr Hubrecht Ribbens**
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Percy Jacobs.

**Next observing evening:** Friday 18 March 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.

#### CONTENTS OF THIS NEWSLETTER

Last month's meeting report	2
Last month's observing evening report	3
Summary of "What's Up?" to be presented on March 23 <sup>rd</sup> 2011	4
Eruptions from the Sun	6
NASA life discovery & Life ingredients found in superhot meteorites - a first	6
FEATURE OF THE MONTH: Extraterrestrial life discovered?	7
Stardust's encounter with comet Tempel 1	8
Double vision: new instrument casts its eyes to the sky & KAROO STAR PARTY 2011	8
New planet system may be most populated yet found & Can WISE find the hypothetical giant planet 'Tyche' ?	9
Africa's Giant Eye: Building the SALT & SKA South Africa eNews	9
Basics: spectroscopic parallaxes of stars	10
Lorna Higgs: Died March 1 <sup>st</sup> 2011 - An appreciation	11
& Recipe for water: just add starlight	11
Aurora Borealis & Pretoria Centre committee	12

### Last month's meeting report - by Johan Smit

The meeting was attended by at least 50 people and included visitors who attended our observing evening on the previous Friday.

The main announcements were our Karoo star party that will be taking place over the last weekend in April 2011, and the upcoming Scope-X event on Saturday, 7 May 2011.

Then Andrie van der Linde summed up ASSA Pretoria's approach towards the safe and responsible use of green laser pointers by astronomers.

He summed up the workshop on laser safety held at the 2010 ASSA symposium as well as the feedback received via our laser safety section on the ASSA Pretoria web site. He showed some slides illustrating the dangers, damage to an irresponsible user's eyes, and how these tools are misused. The message that is spelled out is clear. We need to control these devices properly to ensure that we can continue to use them legally. To do that, ASSA Pretoria proposes:

1. ASSA members are encouraged to register their unregistered laser pointers.
2. The organisers of events such as star parties, Scope-X, viewing evenings, etc, will be liable in accordance with the Occupational Health and Safety Act (Act 85 of 1993) for any incident during the event. The organisers therefore have to define the 'laser rules' for the event and act accordingly.
3. The organisers have the right to confiscate (store in safe place) any non-compliant laser pointer used at the event.
4. It is not necessary for anyone (except presenting astronomers) to use a laser pointer with an output of more than 5mW for astronomy purposes.
5. Presenting astronomers (those who do astronomy presentations to groups of people) may justify the use of stronger laser pointers. Suggested laser output ranged from 10mW to 50mW. The delegates agree that 20mW should be suitable for most applications, but foresee applications for up to 50mW.
6. Approved organisations should be identified (e.g.: ASSA Centres; Universities; SAAO; SANPARKS; etc). These organisations should recommend applications for LSO's.
7. The following 'safe practices' are a good starting point when presentations to groups are done:
  - Lasers should be used by knowledgeable astronomers under controlled circumstances.
  - Do not point at people, aircraft or animals.
  - Keep suitable distance from audience.
  - Warn the audience.
  - Area should be clean of obstacles.
  - Avoid pointing to surfaces that can give specular (mirror-like) reflections.
  - Minimise use (do not play).
  - Keep away from children.
  - Do not use a mechanism that keeps the pointer switched on.

Please take special note of point 1, and start registering your laser pointers.

Then Danie Barnardo took us on a tour of what to see in March 2011. Planetary observers are starved this month with Jupiter and Mars being too close to the Sun to observe. However Saturn is sure to make up for the loss. Observers must have a good look at the typical summer constellations, like Orion, because winter is on its way and they will be replaced by the winter gems. Happily the Southern gems, like the Jewel Box and the rich area between Crux and Vela is getting more and more visible early in the evening.

Danie also advertised the Globe at night campaign to collect data about light pollution. The campaign ended on 6 March. Thanks to the members who submitted observations. To those who did not--do not complain about light pollution when you do not want to assist the fight against it by providing data.

Something special to look out for is the occultation of Delta Scorpii (The bright middle star in the head of the Scorpion) by the moon, early in the morning of the 24<sup>th</sup> of March. Those of you, who want to see this spectacular event, remember to set your alarm to 02:00 on the evening of

the 23<sup>rd</sup> of March. We will any way remind you about this, because our next meeting is on 23 March!!!

Danie also showed what this event will look like from a typical Northern location, like Cairo. There the Moon will miss the star completely. This effect is known as lunar parallax. Think about this when you observe this occultation early in the morning of March 24.

Our main speaker was Dr Robert Groess from Wits University. He has entertained us before, and has always given a talk with some good science content. This time he gave us a different talk on the topic of the "Realm of the Nebulae". It was very light on science, but heavy with intrigue. He gave a description of the search for the original papers of Edwin Hubble that led to the development of his "tuning fork" model of galaxy classification. After an in-depth description of the search and the work of other astronomers, the audience was left with the question: "Did Hubble use the work of his colleagues without giving them credit?" To add intrigue and cast doubt on Hubble's moral values, it was also mentioned in the talk that Hubble specified in his will that his papers be destroyed.

### **Last month's observing evening report - by Michael Poll and Danie Barnardo**

Cloudy all week, cloudy all morning, cloudy all afternoon, cloudy in the evening, not much hope for our observing evening, but it turned out just fine. Eight of us came altogether, including Michael, Danie, Percy, Francois, Gavin and others (apologies for not remembering all the names). There were three telescopes.

There was not a lot of hope of seeing anything, considering the cloud cover, but we had good discussions about many subjects, some of which we were able to illustrate in the sky because all the hot air we were generating opened the clouds up at about 9.30 pm.

Topics discussed included the reports of the solar flares that had been in the newspapers during the week. Some of the attendees were made aware of the websites Spaceweather.com and Cycle24.com. Someone asked about the brightness and visibility of artificial satellites, so Heavens-above was mentioned, and the interpretation of the information therein was explained.

There was discussion about the brightnesses of stars with respect to their real brightness and distance. The real brightnesses of the stars are compared by imagining that they are all placed at the same distance from us – the brightness at a standard distance is called the absolute magnitude of a star. We could by now see Rigel and Betelgeuse which have about the same apparent brightness, but Rigel is 1½ to two times further away, so it must be truly brighter, and therefore much hotter, to shine so brightly over a bigger distance. We then compared their respective colours and noted that Rigel is blue white, and Betelgeuse is red.

The moon was the first thing that emerged from the clouds, so we had a look at that, although it was nearly full. Libration had brought the dark crater Grimaldi well into view, normally this crater lurks around the very edge of the moon. We discussed heights of the mountains on the Moon. For example, the inner wall of the crater Copernicus rises from the crater's floor to a height of about 3,800 metres (about 12 300 feet). The rim of the crater rises to a height of 900 meters (about 3000 feet) above the surrounding maria. The rampart slope from the rim down to the surrounding maria is about 30 km wide. The central peaks of Copernicus consist of three isolated mountainous rises which are about 900 meters high. On this evening, Copernicus was well placed towards the centre of the moon's disc,

We discussed double stars, and the one marvelous example visible in the north was Castor, (Alpha Geminorum), which is now easily split with a 6 inch telescope, having been too close together for most telescopes for the last 30 odd years. It opened up a couple of years ago. We also looked at Gamma Velorum, a duo of hot stars. (The brighter component is a spectroscopic binary).

Someone had asked if all the stars *were* at the same distance, which one would be the brightest? Well, the bright component of Gamma Velorum is not top of the list, but if it were 32.6 light years away (the standard distance for comparing absolute magnitudes) it would be brighter than Venus. One component of the bright star is a Wolf-Rayet star. The double component is

easily separated, even with binoculars, but there are two fainter companions making a T shape with the bright pair. Gamma is the brightest star in Vela, there is no Alpha or Beta Velorum, they were lost when Argo Navis was split up. Canopus was Alpha Argus, and Milaplacidus was Beta Argus. These two stars are now Alpha Carinae and Beta Carinae respectively,

As well as these objects we looked at the Pleiades, it is nearly the end of the season for this cluster, and, with the nearly full moon, only the bright ones were visible in a low power telescope. We looked at the Orion Nebula, (M42), the Trapezium, and we noted the row of three bright stars near the Trapezium. If the nebula is examined with binoculars, there appears to be a double star there - one component is the unresolved Trapezium, and the other component is the brightest star of the three attendants. This binocular double star is designated Theta Orionis.

We got on to discussing the orbit of the moon, and Michael had to justify his statement that "the moon's orbit is always concave towards the sun". This led to a lot of illustrative arm waving and resorted to imagining the trajectory of a white spot painted onto the rim of the wheel of a moving vehicle. A diagram was required! See attached. (One factor that can be noted is that the moon's orbital velocity relative to the Earth is about 1 km per second, and the Earth's orbital velocity around the sun is 30 km per second. Hmm – how fast *does* the moon move??)

The final thing we looked at was Saturn, which was wonderful, with the rings now opening up. We looked at it with a number of magnifications. The shadow of the rings could be seen on the ball of the planet.

After this hour and half of a cloud free, albeit hazy, window, another herd of cloud spread rapidly from the west, so we all left for home at 11.00 pm, well satisfied with the evenings viewing and discussion. It was getting a bit chilly. Gavin was there on his motor bike in shirt sleeves - because of the cloud he had not expected to be there very long..... and Danie had only brought along his "second" scope for the same reason!

**Johan Smit reports:** I was in Johannesburg doing a presentation and some stargazing for the Linden Voortrekkers (Scouts). This is an annual event to help them qualify for their astronomy badge. It was cloudy and not much viewing was possible. But as luck would have it, there was an opening around Orion which enabled us to use the 26 inch refractor on M42, the Great Nebula in Orion. These youngsters were indeed fortunate to see this unforgettable sight. Instead of 4 stars in and around the Trapezium some of them counted up to 11. Despite my open invite to the Pretoria members, no one attended, thereby missing a really unforgettable sight.

### Summary of "What's Up?" to be presented on March 23<sup>rd</sup> 2011 by Michael Poll

**The Equinox** occurs on March 21<sup>st</sup> at 21h08. At this moment the Sun is on the celestial equator, and is moving north.

#### **Moon phases**

March 19 <sup>th</sup>	21h08 full moon
March 26 <sup>th</sup>	14h06 last quarter
April 3 <sup>rd</sup>	16h31 new moon
April 11 <sup>th</sup>	14h04 first quarter
April 18 <sup>th</sup>	04h44 full moon
April 25 <sup>th</sup>	04h46 last quarter.

#### **Moon near bright stars**

Night of March 23<sup>rd</sup> – 24<sup>th</sup>: Near Delta Scorpii.

March 24<sup>th</sup>: The moon will pass in front of (occult) Delta Scorpii.

Disappearance: 02h25

Reappearance: 03h51

Night of March 23<sup>rd</sup> -24<sup>th</sup>: near Antares.

April 17<sup>th</sup>: near Spica.

Night of April 20 – 21<sup>st</sup>: near Antares.

**Planets**

The only planet in the evening sky at present is Saturn, which is fairly near the star Spica, the brightest star in Virgo. Although the moon will be fairly close to Saturn on April 17<sup>th</sup>, it will be Spica that is the nearest bright object to the moon on this date.

Venus, Jupiter Mars and Mercury will be performing a planetary dance in the east before sunrise. Starting in mid-April, the dance will go on for about 6 weeks. The highlight of this sequence will occur on May 11<sup>th</sup>, when Jupiter and Venus are in conjunction, with Mercury very close to the pair, and Mars a bit lower down. The moon will pass by this collection of planets on the mornings of April 30<sup>th</sup> and May 1<sup>st</sup>. Mars will be 0.6 degrees away from Jupiter on the April 30<sup>th</sup>.

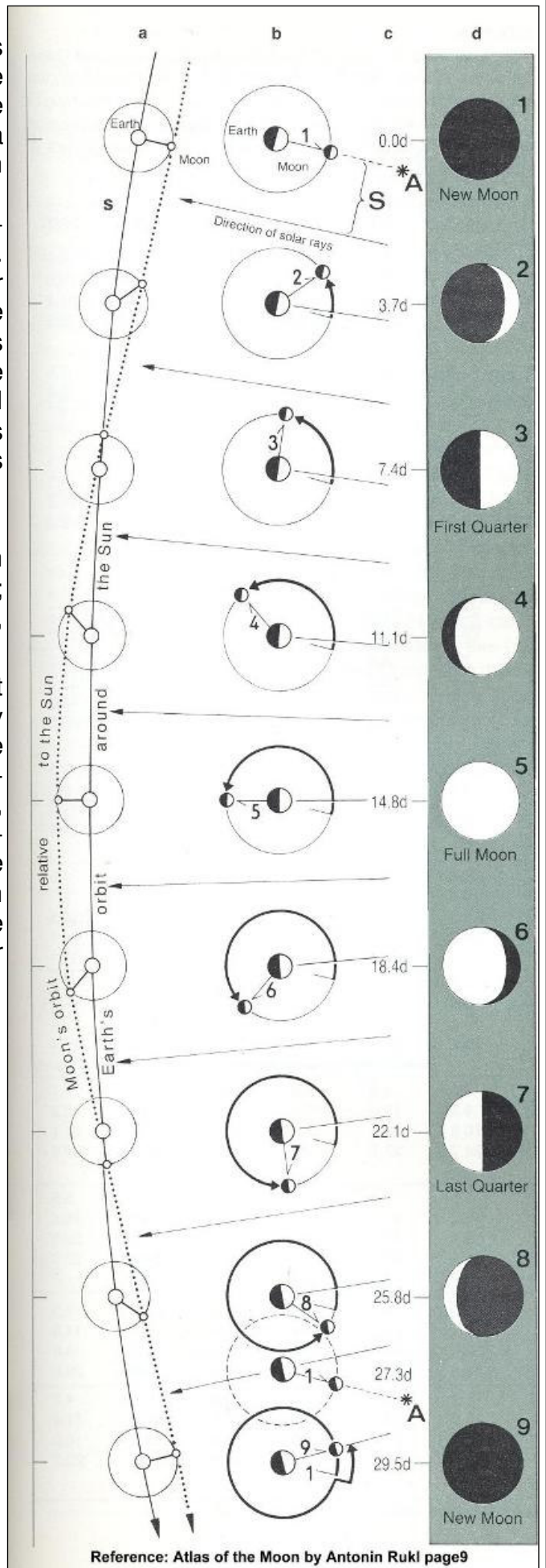
**Constellations**

Constellations visible during this period include, in the north, Canis Major, Gemini, Cancer and Leo; in the east, Virgo and Corvus; and in the south, Carina, Vela, (False Cross), Crux, and Centaurus.

**Beginner's Corner** will look at some topics that follow on from What's Up, including the geometry of Mercury's orbit to explain how this affects the visibility of the planet; a closer look at the constellation of Centaurus; a look at the properties of, and the orbits of, the components of the triple system of stars that comprises the apparently single star Alpha Centauri; and the relationship between the Equinox, the phase of the moon and the date of Easter. Tables for calculating the date of Easter will be presented.

**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 2011



## Eruptions from the Sun



In the image on the left, a gigantic mega-filament of incandescent gas erupts from the Sun. The data was captured by NASA's SDO (Solar Dynamics Observatory). See a movie of the eruption at

[http://www.esa.int/esaSC/SEMYTMRRJHG\\_index\\_0.html](http://www.esa.int/esaSC/SEMYTMRRJHG_index_0.html)

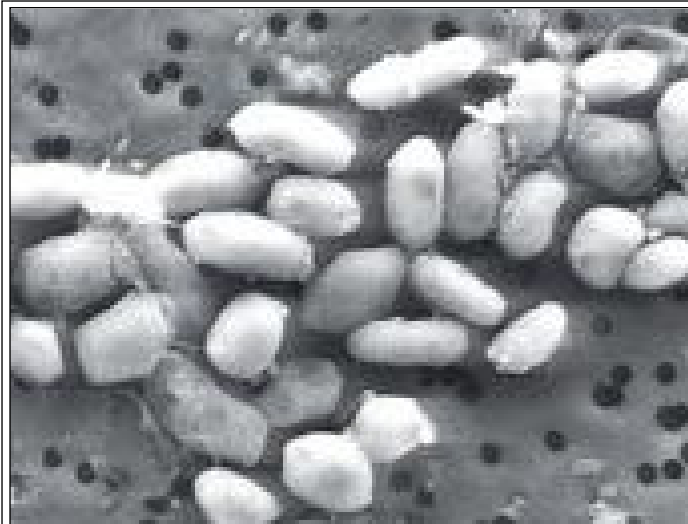
On August 1, 2010, an entire hemisphere of the Sun erupted. Filaments of magnetism snapped and exploded, shock waves raced across the stellar surface, billion-ton clouds of hot gas billowed into space. Astronomers knew they had witnessed something big.

It was so big, it may have shattered old ideas about solar activity. "The

August 1st event really opened our eyes. We see that solar storms can be global events, playing out on scales we scarcely imagined before", said an astronomer.

Explosions on the Sun are not localized or isolated events, astronomers announced. Instead, solar activity is interconnected by magnetism over breathtaking distances. Solar flares, tsunamis, coronal mass ejections - they can go off all at once, hundreds of thousands of kilometers apart, in a dizzyingly complex concert of mayhem.

[http://science.nasa.gov/science-news/science-at-nasa/2010/13dec\\_globaleruption/](http://science.nasa.gov/science-news/science-at-nasa/2010/13dec_globaleruption/)



## NASA life discovery

A recent release hinting at "an astrobiology finding that will impact the search for evidence of extraterrestrial life" had bloggers abuzz with speculation that the space agency NASA had discovered extraterrestrial life.

The truth, however, is that scientists have found life on Earth that is perhaps the most "alien" organism yet seen. A new species of bacteria found in California's Mono Lake is the first known life-form that uses arsenic to make its DNA and proteins, scientists announced.

A scanning electron micrograph of the arsenic-based bacteria is shown here.

<http://news.nationalgeographic.com/news/2010/12/101202-nasa-announcement-arsenic-life->

## Life ingredients found in superhot meteorites - a first

Hot on the heels of finding arsenic-loving life-forms, NASA astronomers have uncovered amino acids - the fundamental foundation for life - in a place where they shouldn't be. The acids - precursors of proteins - have been unexpectedly found inside fragments of previously superheated meteorites that landed in northern Sudan in 2008.

Amino acids have already been found in a variety of carbon-rich meteorites formed under relatively cool conditions.

<http://news.nationalgeographic.com/news/2010/12/101220-asteroid-meteorite-life-space-science/>

## FEATURE OF THE MONTH: Extraterrestrial life discovered?

An exceptional research article was recently received by the **Journal of Cosmology** for publication. Here follows its title and synopsis as well as an official statement from the Editor-in-Chief of the Journal:

### Fossils of Cyanobacteria in CI1 Carbonaceous Meteorites

Richard B. Hoover, Ph.D. NASA/Marshall Space Flight Center

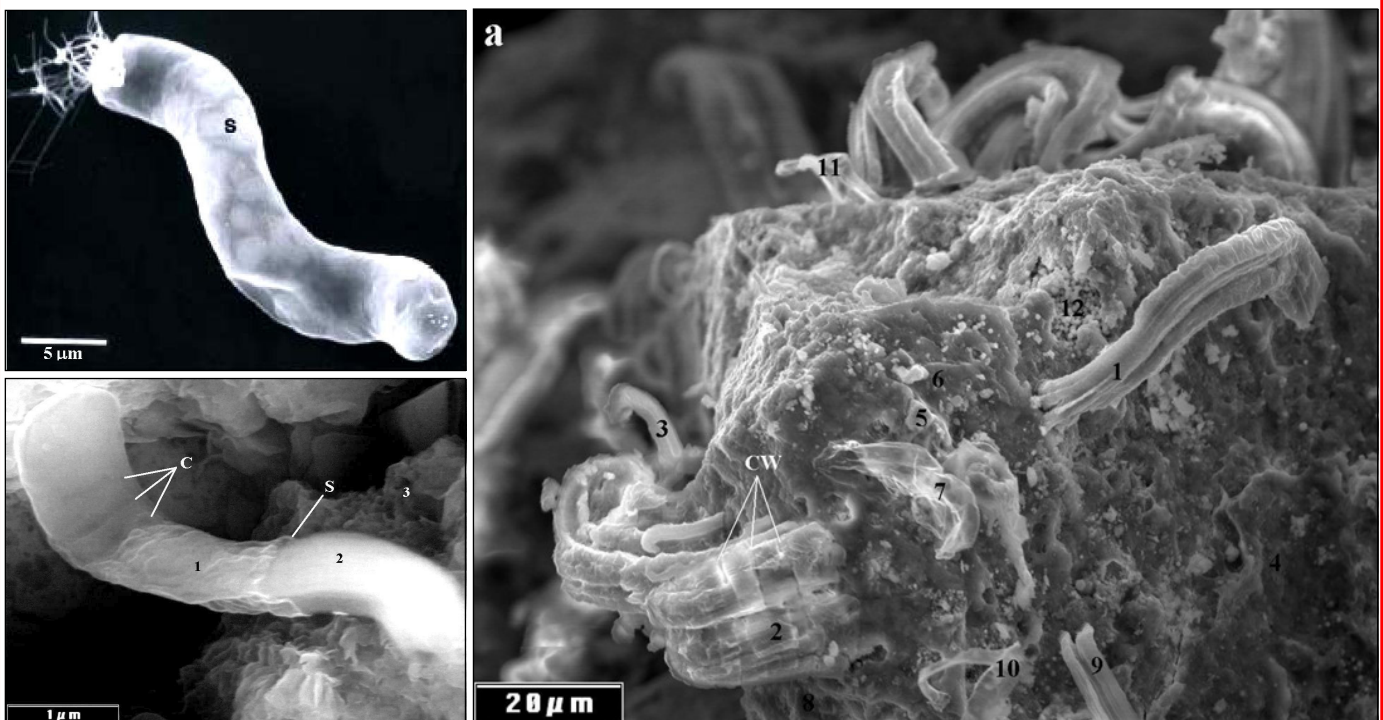
#### Synopsis

Dr. Hoover has discovered evidence of microfossils similar to Cyanobacteria, in freshly fractured slices of the interior surfaces of the Alais, Ivuna, and Orgueil CI1 carbonaceous meteorites. Based on Field Emission Scanning Electron Microscopy (FESEM) and other measures, Dr. Hoover has concluded they are indigenous to these meteors and are similar to trichomic cyanobacteria and other trichomic prokaryotes such as filamentous sulfur bacteria. He concludes these fossilized bacteria are not Earthly contaminants but are the fossilized remains of living organisms which lived in the parent bodies of these meteors, e.g. comets, moons, and other astral bodies. The implications are that life is everywhere, and that life on Earth may have come from other planets.

#### Official Statement from Dr. Rudy Schild, Center for Astrophysics, Harvard-Smithsonian, Editor-in-Chief, Journal of Cosmology:

Dr. Richard Hoover is a highly respected scientist and astrobiologist with a prestigious record of accomplishment at NASA. Given the controversial nature of his discovery, we have invited 100 experts and have issued a general invitation to over 5000 scientists from the scientific community to review the paper and to offer their critical analysis. Our intention is to publish the commentaries, both pro and con, alongside Dr. Hoover's paper. In this way, the paper will have received a thorough vetting, and all points of view can be presented. **No other paper in the history of science has undergone such a thorough analysis, and no other scientific journal in the history of science has made such a profoundly important paper available to the scientific community, for comment, before it is published.** We believe the best way to advance science, is to promote debate and discussion.

Below are some images taken from the research article. The complete article can be read at <http://journalofcosmology.com/Life100.html>



### Stardust's encounter with comet Tempel 1



The spacecraft Stardust made a close flyby of the periodic comet 9P/Tempel 1. The two were closest, about 178 km apart, for a few moments just before 5:40 SAST on February 15th 2011. From engineering telemetry, it was clear that the spacecraft had performed exactly as expected. It had turned on cue during the flyby to keep the comet's nucleus centered and snapped frames every 6 seconds as it zipped by at 10.9 km/s.

The craft's sole camera recorded a diverse and structured icescape, including features that have puzzled planetary scientists ever since Tempel 1 got a visit (and took a celebrated wallop) from the Deep Impact mission 5½ years ago.

The image was made at closest approach.

<http://www.skyandtelescope.com/news/home/116250089.html>

### Double vision: new instrument casts its eyes to the sky



The Large Binocular Telescope Interferometer on Mount Graham, Arizona, USA, has taken its first images of the star Beta Pictoris - an encouraging start for an instrument designed to probe the cosmic neighbourhoods where Earth-like planets could exist.

Eight years in development, the NASA-funded instrument combines beams of light from twin 8.4-meter mirrors. Together, the two mirrors form the largest single-mount telescope in the world.

"The quality of the first-light images is wonderful. The telescope was stable and the instrument was working properly", said the principal investigator for the project.

[http://www.jpl.nasa.gov/news/news.cfm?release=2010-406&cid=release\\_2010-406](http://www.jpl.nasa.gov/news/news.cfm?release=2010-406&cid=release_2010-406)

### KAROO STAR PARTY 2011

The Karoo National Star Party is now becoming a regular event! The ASSA Pretoria Centre wants to hold its third Karoo National Star Party during the weekend of Friday 29 April to Monday 2 May 2011 about 20 km north of Britstown in the Karoo, right next to the N12 at the Kambro Padstal.

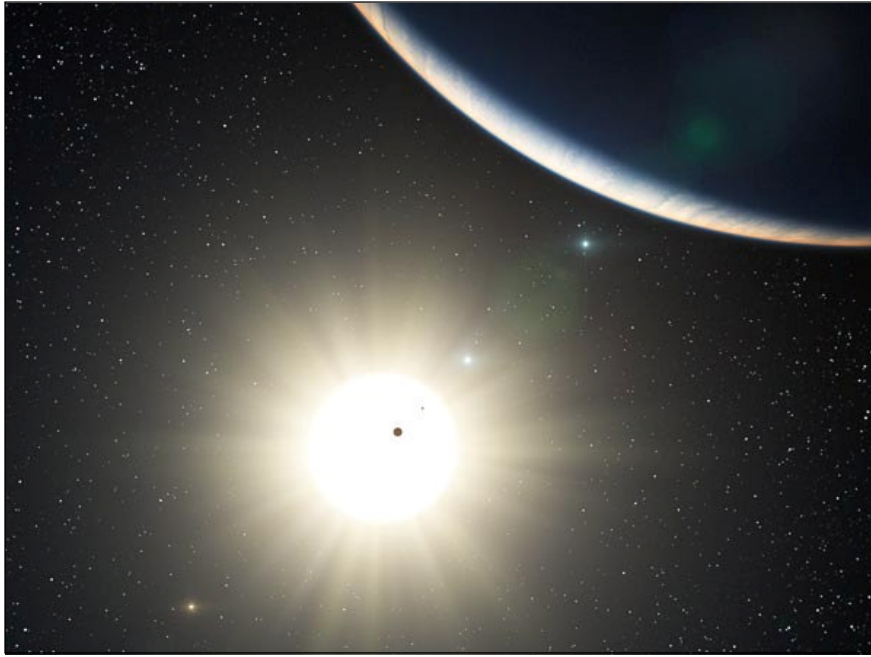
<http://www.pretoria-astronomy.co.za/events.htm>

### Groete

Camrin Bouwer, 'n voormalige lid van ons tak van die ASSA en wat nou in Musina woon, skryf :  
**"Groete hier uit die Noorde vir al die Ster-manne daaronder."**



**New planet system may be most populated yet found**



A densely packed set of planets around a Sun like star may be the closest match yet found to our solar system, at least by the numbers.

Five Neptune-like planets have been spotted orbiting the star HD 10180 — and there's evidence of two more worlds, one farther from the star and another closer in. If the latter observations can be confirmed, the innermost planet may hold the record for the lowest-mass extra solar planet seen to date.

An artist's conception shows the five known planets and their sun.

<http://news.nationalgeographic.com/news/2010/11/101130-new-planets-found-solar-system-twin-science-space/>

**Can WISE find the hypothetical giant planet 'Tyche'?**

In November 2010, the scientific journal Icarus published a paper by astrophysicists John Matese and Daniel Whitmire, who proposed the existence of a binary companion to our Sun, larger than Jupiter, in the long-hypothesized "Oort cloud" - a faraway repository of small icy bodies at the edge of our solar system. The researchers use the name "Tyche" for the hypothetical giant planet. Their paper argues that evidence for the planet would have been recorded by the Wide-field Infrared Survey Explorer (WISE).

<http://www.jpl.nasa.gov/news/news.cfm?release=2011-060>

WISE is a NASA mission, launched in December 2009, which scanned the entire celestial sky at four infrared wavelengths about 1.5 times. It captured more than 2.7 million images of objects in space, ranging from faraway galaxies to asteroids and comets relatively close to Earth.

[http://www.nasa.gov/mission\\_pages/WISE/main/index.html](http://www.nasa.gov/mission_pages/WISE/main/index.html)



**Africa's Giant Eye: Building the Southern African Large Telescope**

This book is now available.

<http://www.salt.ac.za/public-info/salt-book/>

**SKA\* South Africa eNews**

If you want to receive this newsletter regularly, contact Marina Joubert and ask her to put you on her mailing list. Her e-mail address is:

[marina@southernscience.co.za](mailto:marina@southernscience.co.za)

\*SKA = Square Kilometer Array.

## Basics: spectroscopic parallaxes of stars - by Pierre Lourens

“Spectroscopic parallax” is actually a misnomer, because parallax is not involved at all. It is a method to estimate the distance to a star (that is too far away for its tiny parallax to be measured) by (1) measuring its apparent magnitude and (2) making measurements in its spectrum. It is based on distances to nearer stars, determined by measurement of their parallaxes. (See the February 2011 newsletter.) It is first necessary to understand the concepts of collisional broadening and luminosity classes.

Collisional broadening of the spectral lines of a gas is caused by collisions between neutral atoms/ions in the gas with other neutral atoms/ions/free electrons in the gas. Collisional broadening spreads out spectral lines when the neutral atoms/ions in the gas emit or absorb photons while colliding with other neutral atoms/ions/free electrons in the gas. The collisions disturb the energy levels in the neutral atoms/ions, making it possible for them to emit or absorb at a slightly wider range of frequencies. Thus, the spectral lines are wider. The greater the density, the more frequent the collisions, and the wider the spectral lines.

Some spectral lines are particularly sensitive to density, e.g. the Balmer lines of hydrogen. In the spectrum of a main sequence star, these absorption lines are broad because the star's lower atmosphere (where the absorption takes place), is dense and the hydrogen atoms in it collide frequently. In the spectrum of a giant star, these absorption lines are narrower because the star's lower atmosphere is less dense and the hydrogen atoms in it collide less frequently. The width of the absorption lines in a star's spectrum enables astronomers to classify stars in luminosity classes. These are as follows.

- Class Ia: Bright supergiant
- Class Ib: Supergiant
- Class II: Bright giant
- Class III: Giant
- Class IV: Subgiant
- Class V: Main sequence star (= dwarf)

As we go from top to bottom through this list, the density (of the lower part of the star's atmosphere) increases, the width of absorption lines increases and the radius of the star decreases.

These luminosity classes are approximately located on the curves drawn in a Hertzsprung-Russell diagram as shown in the figure. These curves are for stars of which the distances were determined by measurement of their parallaxes. The procedure to estimate the unknown distance to a star is as follows.

**Step 1.** Determine the star's apparent magnitude  $m$  by measurement.

**Step 2.** Determine the spectral classification of the star. This is done by measuring the strengths of the absorption lines in the spectrum of the star. The spectral classification can range from O0, O1, ..., O9; B0, B1, ..., B9; .....M0, M1, ..., M9. We can then draw a vertical line on the graph at this spectral classification.

**Step 3.** Determine the luminosity class of the star. This is done by measuring the widths of the absorption lines in the spectrum of the star. (Luminosity classification is subtle and not too accurate.) Then we know on which of the curves in the figure the star lies. The luminosity is then read off from the vertical axis in the figure. Knowing the luminosity  $L$ , we also know the absolute magnitude  $M$ , because  $M = - (5 / 2) \log_{10} L + \text{a known constant}$ .

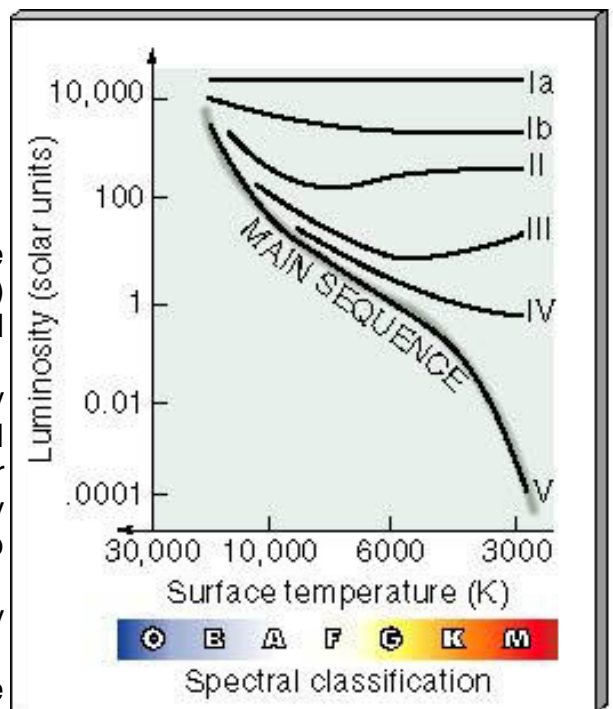
**Step 4.** Solve for the distance  $d$  (in parsecs) from the formula

$$m - M = -5 + 5 \log_{10} d$$

$$d = 10^{(m - M + 5)/5}$$

This gives

**Step 5.** Calculate  $d$ .



## **Lorna Higgs: Died March 1<sup>st</sup> 2011 - An appreciation by Neville Young and Michael Poll**

The Pretoria Centre of ASSA sadly notes the death of Lorna Higgs on March 1<sup>st</sup> 2011. Lorna was a long time member of the Pretoria Centre, and, although over the past couple of years her lack of mobility prevented her from attending our monthly meetings, she was still a strong supporter of the Centre and took a keen interest in Centre affairs.



It can be said that the Centre owes a great deal to Lorna, and we admired her strength in coping with her disabilities - maybe though, she would not have described them as such. She was an inspiration to a number of our members.

Lorna joined the Pretoria Centre on July 1<sup>st</sup> 1993, and for about five years in the 1990s she was a member of the Centre Committee, being responsible for placement of meeting notices in the local newspapers and serving as Deputy Treasurer. She returned to the Committee in July 2003 until ill health forced her resignation in July 2008. Her input to the Committee was always helpful and appreciated, and she occasionally hosted Committee meetings at her home complete with tea, coffee and snacks, and generous hospitality.

Lorna chaired a number of the Centre monthly meetings, presented "What's Up?" on occasions, and gave several main topic talks. The subjects of her talks were quite varied, and included "The Death of Stars", "Planet Earth – from Nebula until Now", "Measurement of Time", "How to Observe a Partial Solar Eclipse, and "Bright Stars and Some History" .

When possible, Lorna supported functions that the Centre organised, including a visit to Hartbeeshoek in 2000, and the ASSA Symposium at Aloe Ridge in 2002.

In 2008 Lorna received the Jack Bennett Award for services to the Pretoria Centre. Lorna's presence will be greatly missed by the Pretoria Centre. Condolences are expressed to her children, Richard and Guinevere.

Please note that no announcement of a date for the funeral was seen, and despite a number of searches, we were not able to ascertain a time and date.

### **Recipe for water: just add starlight**

ESA's Herschel infrared space observatory has discovered that ultraviolet starlight is the key ingredient for making water in space. It is the only explanation for why a dying star is surrounded by a gigantic cloud of hot water vapour. Every recipe needs a secret ingredient. When astronomers discovered an unexpected cloud of water vapour around the old star IRC+10216 in 2001, they immediately began searching for the source.

IRC+10216 is a red giant star, hundreds of times the Sun's size, although only a few times its mass. If it replaced the Sun in our Solar System, it would extend beyond the orbit of Mars.

The Herschel water detection made the astronomers realize that ultraviolet light from surrounding stars can reach deep into the envelope between the clumps and break up molecules such as carbon monoxide and silicon monoxide, releasing oxygen atoms. The oxygen atoms then attach themselves to hydrogen molecules, forming water.

[http://www.esa.int/SPECIALS/Herschel/SEM76EODDG\\_0.html](http://www.esa.int/SPECIALS/Herschel/SEM76EODDG_0.html)

## Aurora Borealis

This photo of the Aurora Borealis (Northern Lights) was taken by Geir Nøtnes on Lofoten island, Norway, on February 14, 2011. For more photos, see

[http://spaceweather.com/aurora/gallery\\_01feb11.htm](http://spaceweather.com/aurora/gallery_01feb11.htm)



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### Andromeda

