

"The Southern Cross"



HERMANUS ASTRONOMY CENTRE NEWSLETTER

JULY 2010

Welcome to this month's newsletter, and also to new member Martin Lyons. We hope you enjoy the newsletter, the New Scientist article on mega-meteors, and the Astronomy magazine article on numbers in the Solar System. In response to members' enquiries, an article on the so-called 'Full moon illusion' is also attached. Remember that the Centre's website www.hermanusastronomy.co.za is also a rich source of information.

For those interested in attending the Beginners astronomy interest group, the next meeting is scheduled for Monday 9 August.

The red planet, Mars, (currently visible to the north in Leo), has a rival which is also easy to observe in our winter night skies. Antares, identified by the Arabs as the 'heart' of Scorpius (overhead at this time of year) is so-called because it has a reddish colour, similar to that of Mars. Its name, derived from Ancient Greek, means 'holds against Mars', 'Mars rival' or 'Mars-like'. The 15th brightest star in the night sky, Antares is a red supergiant, estimated to be the 10th largest known star (Betelgeuse is 9th). 600 ly away from Earth, it is 800 times larger, and 10,000 times brighter, than the Sun. Its distinctive colour has made it central to rituals in many cultures. For example, many ancient Egyptian temples are orientated so that Antares is visible during ceremonies.

LAST MONTH'S CENTRE MEETING

Johan Retief gave a very interesting and comprehensive presentation on astronomy at the Cape of Good Hope. It was fascinating to learn how a few people, based at the far end of the African continent, were able to contribute so much to the knowledge and understanding of astronomy.

MONTHLY CENTRE EVENINGS 2010

These take place at 7 pm at the **Hermanus Magnetic Observatory**.

15 July	'Deep space and deep time: related or not?' by Ed Foster, biochemist and amateur astronomer
12 August	Presenter and topic to be confirmed
9 September	Presenter: Case Rijdsdijk, scientist and amateur astronomer Topic to be confirmed
7 October	'Comets: the trailblazers' by John Saunders (chairman)
11 November	Presenter: Amanda Gulbis, Astronomer, SAAO, Cape Town Topic to be confirmed
9 December	Christmas party

ACTIVITIES

Beginners astronomy interest group Seventeen people, including non-members, attended the meeting held on 14 June. The 'Introduction to astronomy' presentation was followed by the 'Fantastic trip - to the power of 10' slide show, which takes you from a leaf in your garden to the edge of the universe in multiples of the power of 10, and back down to the atoms of the leaf, dividing by the power of 10. Although there was some cloud, a number of objects in the night sky were visible through the Dobsonian telescope, including the rings of Saturn, Omega Centauri and the Moon.

Cosmology interest group The cosmological constant was the topic discussed by seven members who attended the meeting on 21 June.

'Whale talk' article An article by John Saunders on 'Our nearest star - the Sun' was published in the June/July issue of the magazine.

OBSERVATORY NEWS

The observatory plans continue to move slowly, as we still need to raise R100,000 to complete the Environmental Impact Assessment (EIA). Our application to the lottery board submitted at the end of January remains pending their consideration. In the meantime, we plan to also submit an

application the Shuttleworth Foundation for their consideration. We will also be meeting other interested parties later this month in the continuing endeavour to raise funds for the EIA, and for the construction of the observatory.

The "Friends of the Observatory" Pledge Campaign remains active and all donations are gratefully received. All persons that pledge support will have their names engraved on a plaque to be proudly placed in a position of prominence at the observatory education centre for all to see. The campaign is aimed at anyone, member or non-member. For further information on the Friends of the Observatory campaign, please contact John Saunders.

Despite the current challenges facing it, the project is still very active and the HAC remains determined and fully convinced that there will be an observatory in Hermanus in the not too distant future.

ASTRONOMY NEWS FROM STEVE KLEYN

1 Silent student's Spacecraft University of Tokyo's professor Shinichi Nakasuka and his team have designed a microwave-oven-size spacecraft UNITEC-1 to test competing computer chips' resistances to space radiation. Launched on 21 May, radio signals from the spacecraft were initially picked up but have been followed since by an ominous silence. The reasons are still not clear. The team is concerned that it has broken down, but are continuing to work on the problem.

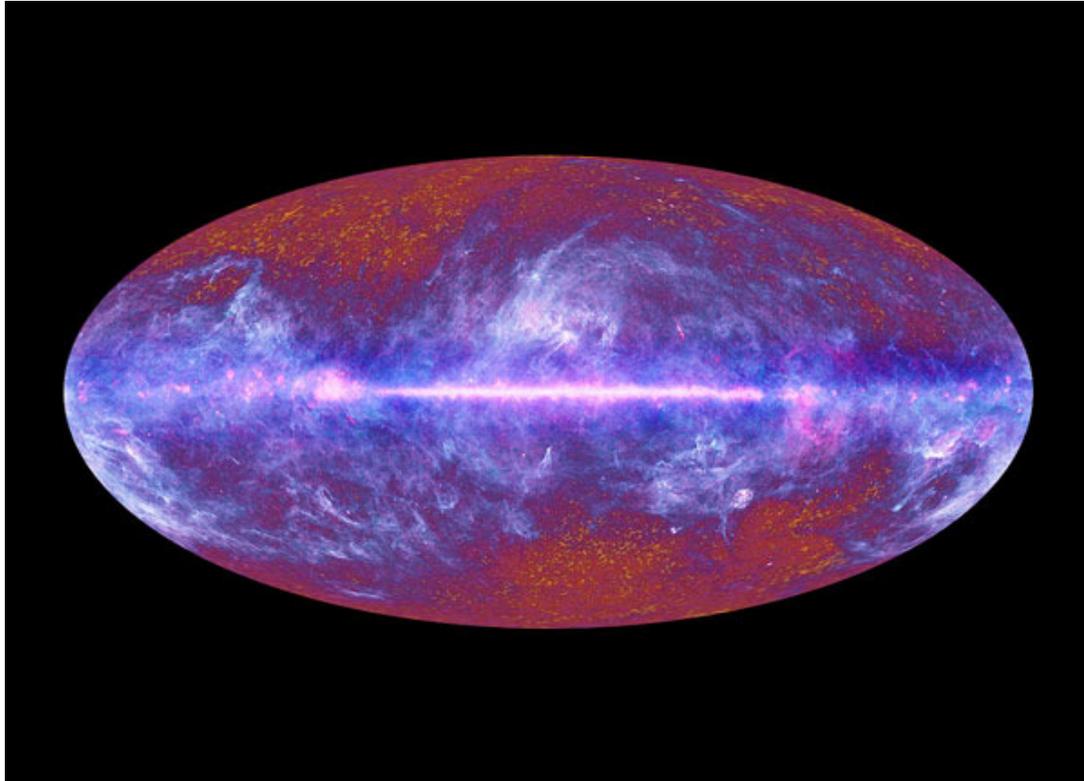
The now completed Hyabusa mission also went awry for quite a while, but was successfully recovered, and the samples from an asteroid have since landed safely in the Australian outback, been recovered, and are being analysed in laboratories in Japan. However, one cannot help thinking of the disappearance of the UK's Beagle 2 Mars lander!

2 Planck's new ultra clear view of the beginning of the universe The Planck telescope, the biggest cosmology experiment in nearly a decade, has captured its first full sky map of the cosmic microwave background.

The image below shows the Milky Way as a bright, horizontal band through the centre with "streamers" of cold dust extending above and below. The interesting part to researchers is the scattering of yellow flecks in the red background. These oldest photons in the universe are thought to have been

generated about 380,000 years after the Big Bang, when matter was finally cool enough to start forming atoms.

In this data, physicists will seek out some signature of inflation, a period of rapid expansion just a fraction of a second after the Big Bang. It may also confirm the existence of the "axis of evil" - a weird alignment of hot and cold spots in the emptier regions of space. Planck will also stare into an ominous hole in space that some physicists suggest is evidence that our universe is not the only one.



Planck was launched in May last year and began taking data in August, releasing its first "strip" of the sky map in September. By the end of its mission in 2012, Planck will have made four maps of the universe.

3 Barack Obama declares war on space debris The White House has announced plans to share more information with other countries in a bid to prevent satellite collisions. The US will also fund research into cleaning up the space junk that's already there. Pooling information with other countries should help reduce the chances of another satellite collision like one in February last year that produced thousands of pieces of high-speed debris.



Existing space litter.

Previous space policies have dealt with preventing space debris, but the Obama administration also calls for research into technologies that could remove space debris already in orbit, such as laser tractor beams.

DID YOU KNOW?

We complete our exploration of the 10 brightest stars in the night sky by looking at Betelgeuse. We also find out something about **variable stars**.

Betelgeuse (Alpha Orionis)

Despite its 'alpha' title, it is the second brightest star in Orion. Betelgeuse was mistakenly named brighter than Rigel because of its variable luminosity, potentially the effect of a hotspot, which creates an illusion of being brighter at certain times. Its name means 'armpit of the central one' (Arabic), a reflection of its position on the 'body' of the hunter, Orion.

It is a red super-giant, one of the largest known stars, with a diameter 900-1,000x that of the Sun. If it was positioned in the solar system in place of the Sun, it would extend to between Mars and Jupiter.

Vital statistics

- 650x size and 18x mass of the Sun
- 55,000x brighter than the Sun
- 427 ly away
- $m = 0.45$ (ranging from 0.3 - 1.2, a consequence of its being a **variable star**). $M = -5.14$

It is surrounded by a large shell of dust of its own making, making it difficult to locate the 'actual' surface and identify its size accurately. Although very

large now, it was probably even larger when it was a main sequence star, with a loss of up to 50% of its mass in stellar winds over time. Although thousands of stars are probably as big, or bigger, than Betelgeuse, very few are visible to the naked eye. One example is Mira in Cetus, with its outer layers hardly held in place by gravity.

Betelgeuse is reaching the end of its life, probably fusing helium into carbon and oxygen, with a reduced, dense core and overall expansion. It is expected to become a supernova and then ends its life as a neutron star. For its size, it is old and could soon or may have already exploded.

It forms the southern hemispheres 'summer triangle' with Sirius (Canis Major) and Procyon (Canis Minor).

Variable stars

A variable star is one whose apparent brightness from Earth changes over time. Most stars probably have some variation, including the Sun.

2 types

- intrinsic variables
 - actual changes in stellar luminosity eg. result of periodic swelling and shrinking (pulsating variable), eruptions, hotspots eg. Betelgeuse
- extrinsic variables
 - apparent changes due to changes in the amount of light reaching the earth eg. when eclipsed by an orbiting star

Sources: <http://en.wikipedia.org>, www.space.com/scienceastronomy

Oxford dictionary of astronomy, Astronomy (Dorling Kindersley - Eyewitness companions)

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