"The Southern Cross"

# HERMANUS ASTRONOMY CENTRE NEWSLETTER

## JUNE 2009

Welcome to the latest newsletter, and also to new members Derrick Dickens, Krister Ljundqvist, Adele Mathee and Frans Theunissen.

Two New Scientist articles, one on the effects of black holes and the other on pulsars, are also attached.

The Centre now has its own website, which can be accessed at www.hermanusastronomy.co.za. The site has been developed by centre member Derek Duckitt, who will continue to maintain and update it. Members are encouraged to view the site, which includes centre publications like the current newsletter and sky map, in addition to wider material on astronomy, including links to relevant websites. Derek welcomes feedback and suggestions from members.

The distinctive S-shape of the eponymous constellation of Scorpius is visible in the night sky during the winter months. It can be found to the left and slightly south=east of the Southern Cross and the Pointers. Its 'heart' is the red supergiant Antares (Alpha Scorpii). Although more than 10,000 times brighter then the Sun, its distance of 600 light years from Earth makes it only the fifteenth brightest star visible to the naked eye.

## CENTRE MEETING – 28 MAY

The new Centre website was formally introduced by member Derek Duckitt in an informative demonstration of web-based astronomy resources. He also introduced the Astro CD and Astro DVD which have been produced by the South African Astronomical Observatory (SAAO). In addition to videos on the new South African Large Telescope (SALT), they include information on a number of aspects of astronomy and cosmology, and also identify a number of links to Internet resources, including Stellarium. Copies of the CD and DVD are available to purchase at centre meetings for R20 each.

Derek also introduced two extensive astronomy websites, Google Sky and Microsoft's World Wide Telescope. Links to these, and other useful websites can be found on the Centre website. The 'Previous meeting feedback' section of the website also includes information on the usefulness of the websites he presented.

## FUTURE CENTRE EVENINGS 2009

The monthly Thursday meetings will be held at 7 pm on the following days:

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| 25 June (details below) | 22 October |
| 23 July | 19 November |
| 20 August | 17 December |
| 24 September | |

The presenter at the June meeting will be Dr Amanda Gulblis from the SAAO in Cape Town. Her topic is the minor planets in the outer solar system, focusing particularly on Pluto.

## ACTIVITIES

**Cosmology interest group** Thirteen members attended the meeting held on 25 May. The topic of nucleosynthesis sparked a lively discussion on the origin of chemical elements in the universe, and energy production in stars.

**Educational resources** Pierre de Villiers and Frans Marais have been working on the educational aspect of the HAC, attending pupil lectures with the SAAO in Cape Town and obtaining a considerable amount of educational

material such as DVD's, make-your-own telescopes, superb posters and information brochures etc. which include ideas to celebrate the International Year of Astronomy, and will be made available to the schools and outreach groups throughout the Overstrand.

All of this is crucial to the funding of the observatory as the main thrust for funding is based around the educational aspect. It will, of course, also add to the impetus to educate the students and pupils on the wonders of the night sky and the importance to more understanding of our universe works.

**Overstrand LEDA** A meeting has been arranged on 17 June with the CEO of the Overstrand Local Economic Development Agency (Pty) Ltd, at his request. Details of the meeting will be relayed to HAC members at the Centre meeting on 25 June and also in the July Southern Cross newsletter.

**Hermanus Magnetic Observatory** A further meeting has been arranged with Dr. Malinga, Director of the National Research Foundation in Hermanus (formerly the HMO) to put some 'butter-on-the-bread' of the agreement for closer collaboration with the HAC. The NRF have already agreed for us to have a corner in their new educational facility dedicated to supplies of information and brochures concerning the work of the HAC.

## OBSERVATORY COMMITTEE REPORT.

John Saunders and Pierre de Veilliers attended a meeting on 8 June with the Leon Theron of the Whale Festival Media & Marketing Company to discuss progress with obtaining funding. Leon advised that he has contacted a number of possible sources such as international observatory and other companies and bodies known to fund such ventures, but that no actual commitments have been made, to date.

The pursuit of funding will continue, with other events, such as the Arabella golf day with art auction, planned, but still to be arranged.

No further news on the planning application has been heard. However, further meetings are planned in the near future with the Mayor and Town Manager, to discuss progress.

## ASTRONOMY NEWS FROM STEVE KLEYN

**1 Repairing Hubble** Even rocket science has to occasionally give way to simple, old fashioned methods of persuasion like a hammer or a boot. During the recent successful refurbishing of Hubble, the astronauts had to reort to using brute force. First, the installation of Wide Field Camera 3 failed because a single bolt securing the old camera refused to budge. Every tool at their disposal did not help and ultimately they were authorised to use whatever force it required. After a tense 'wait-and-see", Drew Feustel was heard to cheer: brute force had prevailed.

The next major job was to repair the Imaging Spectrosope which had lain idle since 1990 due to the failure of a power converter. A handle which blocked access to the instrument would not budge and, after struggling for ninety minutes, Mike Massimo eventually kicked and yanked at the handle until it finally broke off.

Mission accomplished, Hubble was released back into space on the 19th of May.

**2 Mars robots** may have been destroying the very evidence of life that they were looking for! They may been "toasting" them instead. Even if life had not been started, at least some organic molecules deposited by past cometary debris and meteorites should have been found, but were not. However, the Phoenix lander, last year/ found evidence of something that might have been hiding the organics; a class of chemicals called perchlorates. When heated sufficiently, perchlorates release a lot of oxygen which, at these temperatures, destroys organic molecules very quickly. All the tests for life involve heating the samples to vapourise them to analyse them in gas form. If organics and perchlorates were together in the sample, q.u.e.d no organics to be found.

## DID YOU KNOW?

Two issues of the newsletter will include information on the small objects at the outer edges of the solar system, beyond Neptune. This month, we look at the Kuiper belt and the scattered disc. Part 2, next month, will include information on comets and the Oort cloud.

**Kuiper belt**

The existence of a region of the solar system beyond Neptune was first postulated in the 1930s. The belt extends 30 – 55 astronomical units (AU) (an AU is the mean distance between Earth and the Sun). It is similar to, but larger, than the asteroid belt – 20x as wide and up to 200x bigger in volume. However, its total mass is small for its vast extent – $1/10^{th}$ of mass of Earth.

The first Kuiper belt object (KBO), apart form Pluto, was identified in 1992. The belt consists mainly of small bodies, but there are at least 3 dwarf planets – Pluto (largest), Haumea and Makemake (both 1,200km in diameter). Since 2000, a number of KBOs with diameters from 500 – 1200 kms (about half that of Pluto) have been discovered. Overall, the belt is believed to contain >70,000 objects >100k in diameter.

Like the asteroid belt, the Kuiper belt contains fragments of the proplanetary disc that failed to coalesce into planets. Unlike the mostly stone and metal asteroids of the asteroid belt, however, KBOs are mostly frozen 'volatiles' – methane, ammonia, and water. The term 'objects' is used to avoid the need to classify them as either comets or asteroids, but most are believed to have comet-like characteristics. However, they tend not to have the eccentric orbits of many comets, and tend to be larger than comets.

The Kuiper belt was initially believed to be the source of periodic comets, but the belt is dynamically stable and not affected by Neptune's orbit. Comets are more likely to originate in the scattered disc, an area beyond the outer edge of the K belt which is affected by Neptune

In 2006, the New Horizons spacecraft was the first one sent specifically to explore the Kuiper belt. It is scheduled to reach Pluto in 2015.

**Scattered disc**

This is a poorly understood, sparsely populated, formation which extends 100 AU beyond Kuiper belt. Some see it as the outer part of the Kuiper belt, while others see it as separate.

The disc contains scattered disc objects (SDOs) with very eccentric orbits – this is the main way it differs from the more stabile orbits found in the Kuiper belt. The first SDOs were identified in 1996, with >100 recognised by 2008. Like KBOs, SDOs are made of low density volatiles – gases and water

Distance makes SDOs more susceptible to the influence of Neptune's gravitational effects, hence the less stable orbits. When their orbits are nearer to the centre of the solar system, they are affected by Neptune and the other gas giants. These planetary perturbations can move them even closer to the Sun and the inner solar system in the form of periodic comets.

**Reference** http://en..wikipedia.org

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