

november 2008



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monthly newsletter of the johannesburg centre of assa

Old Republic Observatory, 18a Gill Street, Observatory, Johannesburg  
PO Box 412 323, Craighall, 2024



**We have liftoff: Falcon 1 soars into space from its launch pad in the Kwajalein Atoll in the Central Pacific.**

**contents**

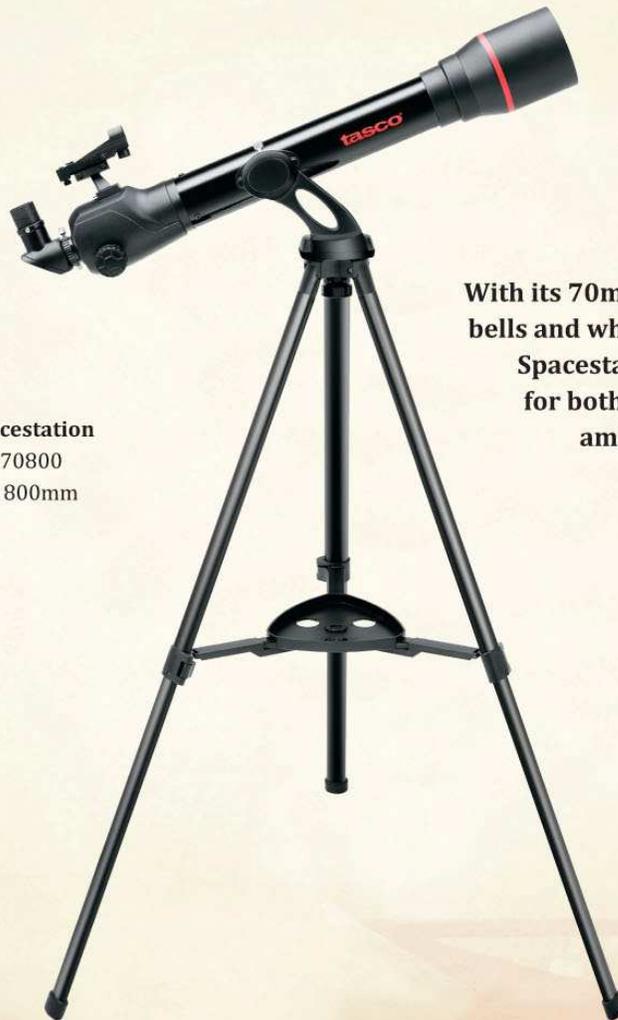
chairman's chat .....	5
world first for SA space entrepreneur .....	10
quantum mechanics for moons .....	12
astro news .....	14
focus on: NGC 6752 .....	17
the sky this month .....	18

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## notice of next meeting – assa johannesburg

The next monthly meeting of the Johannesburg Centre of the Astronomical Society of Southern Africa will be held at the Old Republic Observatory, 18a Gill Street, Observatory, Johannesburg on Wednesday, 12 November 2008 at 20h00:

Guest Speaker: Claire Lee on

### **“Exploring the Universe through Particle Physics: Cosmology and the LHC”**

### assa johannesburg calendar

Date	Event	Details
8 November	Committee Meeting	Observatory @ 14:00
12 November	MONTHLY MEETING	Observatory @ 20:00 – Claire Lee: “Exploring the Universe through Particle Physics”
TBA	Year End Function	TBA

### assa johannesburg committee members 2008/2009

Portfolio/Interest	Name	E-mail	Contact details
Chairman & Treasurer	Robert Groess	groess@gmail.com	083 365 8092 011 902 9293 (FAX)
Vice-chairman	Gary Els	gels@randwater.co.za	
Secretary	Alec Jamieson	arjam@iafrica.com	082 654 5336
Curator of instruments	Chris Curry	chris@barefeet.co.za	082 494 4659
Without portfolio	Oleg Toumilovitch	oleg@foton.co.za	082 680 4700
Webmaster	Barend Botha	bjbotha@yahoo.com	
Canopus Editor	Claire Lee	claire.lee@cern.ch	084 508 6941
PR & Media Liaison	Sharon Tait	labelconnection@mweb.co.za	082 455 0819

#### ASSA Jhb. Library:

The library opens from 6 PM to 7:45 PM, before monthly meetings (8PM) held at the Observatory. The library is situated in the building behind the large telescope dome. Instead of parking in front of the telescope dome, one can drive round to the back of the telescope dome and park close to the library. The library is a good place for new members to come and introduce themselves and find out more about the society.

#### Telescope making classes:

ATM classes are held on the premises of Parktown Boys' High School on most Saturday afternoons.



## editorial

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by Claire A. Lee

As the year draws to a close one begins to feel the press of time: the realisation that another year is almost over, the list of things to complete before you can relax with a Christmas roast just gets longer, and *where on earth did the past 3 months go?*

Astronomically it has been a rather exciting year, with (amongst other things) the launch of GLAST Fermi Gamma-ray Space Telescope and SpaceX's Falcon 1, First Light for DUT's Indlebe radio telescope, the Great Turn-On and then breakdown of the "Big Bang machine" - the LHC, and the Chinese and Indians entering the space race. But all of this excitement will pale in comparison when the clock ticks over to the 1<sup>st</sup> of January 2009 and we enter the International Year of Astronomy.

Some of you may remember back in 2005 we celebrated World Year of Physics, the 100<sup>th</sup> year anniversary of Einstein's *annus mirabilis*. Well, now it is astronomy's turn, and the IYA2009 team have a whole host of exciting things planned for next year.

Currently there are 129 countries world-wide participating in the activities including South Africa, led by the eternally enthusiastic Kevin Govender whom I'm sure many of you know from star parties, etc. South Africa's kick-off contribution to IYA2009 is an all-night public star party at SALT in Sutherland. Kevin is also calling on you, the astronomy committee, to put pen to paper and think up some exciting activities to happen in 2009 (see page 7 of this month's *Canopus* for details). It would be fantastic if the members of the ASSA-Jhb Centre really get involved in the year's activities, so put your thinking caps on, or alternatively visit the SA website [www.astronomy2009.org.za/](http://www.astronomy2009.org.za/) for a "to-do list" of activities that you can help out on. As for me, I'll be putting my keyboard where my mouth is and participating in one of the Cornerstone Projects, a blog called the "Cosmic Diary", following the lives of astronomers around the world (yes, even though I'm a physicist).

On a completely orthogonal note, much to my chagrin I missed International Mole Day on the 23<sup>rd</sup> of October between 6:02 am and 6:02 pm (the chemists among us will know that the mole is defined as the amount of substance of a system which contains as many "elemental entities", eg atoms, molecules, ions, electrons, as there are atoms in 12g of Carbon-12: roughly Avogadro constant ( $N_A$ ), or  $6.02 \times 10^{23}$ ). Actually, I didn't miss it *per se*, I just missed saying anything about it, which amounts to much the same thing for me. So I just thought I'd say something now.

Well, that's about it for this month, other than for me to say do check out Wayne Mitchell's deep sky atlas (ad on page 16). I saw one at Kevin G's Astronomy Outreach workshop he organized earlier this year, and it is stunning. Would make a great Christmas pressie, in case any of you are looking for ideas, and you get extra points for supporting local stuff! ■

## chairman's chat

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by Robert Groess

And so it was that we started off the rainy season on 18 October. The flock of optimists who came to the star party at the War Museum that night were all in agreement that we should have started the rainy season a month earlier. In any case, thunder bolts and lightning were the highlights of heavenly phenomena that could be observed. Being astronomers, it's always good to have a plan B. And plan B was, in contrast, a great success. (Please don't get me wrong, we really need the rain!)

Plan B involved screening of the SA Antarctic expedition DVD, as well as the company of special guest of honour, Prof. Derck Smits, who, after having been to Antarctica himself, was on standby to field any questions. For those that braved the weather, the evening was indeed salvaged! A special word of thanks to all who came and made the event possible, as well as the visitors and members who supported it! Next year we'll know to kick off a little sooner with a star party!

International Year of Astronomy 2009 (IYA2009) is coming up fast and furiously. In an unprecedented move by the South African Astronomical Observatory (SAAO), the night of 31 December 2008 will be set aside for the public to come and enjoy spectacular vistas of the Karoo night sky from the plateau on which the telescopes are situated. Even SALT will put its queue scheduling on hold for the public to have a sneak peek at what makes this Giant Eye tick. Booking for the event has not yet opened at the time of going to press, but keep a close eye on the ASSA Jhb. website [www.assajhb.co.za](http://www.assajhb.co.za), or straight from the horse's mouth, [www.saa.ac.za](http://www.saa.ac.za).

For those of you who couldn't make it to the Wits University great hall on the evening of 13 October, the South African Institute of Electrical Engineers (SAIEE)'s annual Bernard Price Memorial Lecture guest speaker this year, was Professor Sami Solanki from the Max Planck Institute of Solar System studies. Prof. Solanki gave an absolutely rivetting discussion on our nearest star, the Sun – spiced with a delectable mix of humour and pictures of some heavenly bodies from popular German magazines! It was a great joy and honour to collaborate with the SAIEE on a prestigious venture such as this, and those that attended, no doubt enjoyed the evening very much.

The end of year is fast approaching, and details of our end-of-year function will be in the next edition of Canopus – along with details on our website and the distribution lists.

That leaves me to wish you all the best, until next month.

Robert ■

## invitation to join newly created cosmology section

by Frikkie de Bruyn

At their meeting held on 27<sup>th</sup> August 2008, the ASSA Council approved in principle the establishment of a Cosmology Section.

It is envisaged that members of the Cosmology Section will consist of those who will actively participate in the research and those who are interested but who merely wish to be kept informed of the latest developments via email or by post.

Interested persons who do not have a computer are very welcome to join. You will be kept informed/participate via telephone/post. We will start very slowly with plenty of explanations for those with no or very little knowledge of mathematics. All interested persons are welcome to join irrespective of your knowledge/lack of knowledge of cosmology.

All members are requested to indicate their interest to join the section by contacting Frikkie de Bruyn on:

Email: [debruyn1@telkomsa.net](mailto:debruyn1@telkomsa.net),

Tel: (033) 3963624

Cell: 082 255 1690

Membership is free of charge and is open to both amateurs and professionals. The only requirement is an interest in Cosmology. ■

### COSMOLOGY MARCHES ON



## call for proposals for IYA 2009

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from Kevin Govender, IYA 2009 Point of Contact for South Africa

2009, the International Year of Astronomy, is approaching fast and the excitement is building! It's now time to start implementing!

This is an open call to the astronomy community to put your many ideas down into simple "one page proposals" so that we can try to get you the resources and collaborations to make your activities happen in 2009! For those who would rather simply adopt an activity that needs doing there is also the "to-do" list on the IYA website ([www.astronomy2009.org.za/projects/full-list/](http://www.astronomy2009.org.za/projects/full-list/)) that you are welcome to contribute to.

Please note that this call for a "proposal" is independent of calls we may later receive from the SA government or SAASTA - this is simply an effort in coordinating the activities we hope to make happen in 2009. There isn't an immediate slush fund available for these simple "one page proposals" - but we hope to be able to raise funds and resources for them.

Please note that all your proposals will be placed onto the IYA website (i.e. it will be public) which will be to your benefit as more opportunities for funding come up from various sources all around the world - such as the recent EAS one. Making these proposals public will also help our small community to share ideas and interact with each other on various projects. Some of your proposals may not need funding or may already be funded but will be important in coordinating the activities so as to maximise the support and benefits (e.g. if you have a project for a star party then we may provide you with telescopes or handouts etc that may enhance the activity).

I encourage every individual or organisation who has any plans for IYA2009 to send in your simple one pager(s) (send to [info@astronomy2009.org.za](mailto:info@astronomy2009.org.za)) so that we can create a database and thus support and enhance your activities, either with funds, resources, volunteers or collaborations. The sooner you get them in the better - it shouldn't take you more than a few minutes to brainstorm with your colleagues and then send us a description. We'll follow up with you for more details should we need them.

Please send in your one page proposal(s) containing the following:

1. Title (just a name for your project - for our reference)
2. Name of implementing organisation or individual
3. Contact details (especially cellphone numbers and email addresses)

4. Brief description of activity (just a paragraph or two of what the project entails and how it will work)
5. Estimated funds required (no need for great detail - just a rough estimate and breakdown of costs needed to make it happen)
6. Date and venue of implementation (when and where would you like it to take place)

The idea is to give us a sense of the project and we will then contact you should we need more information. It's fine if it's a little over a page but please try to keep it concise. You may send it in the text of an email or in any commonly readable document format (doc, pdf, txt, etc). Send all proposals to [info@astronomy2009.org.za](mailto:info@astronomy2009.org.za). You may send in as many proposals as you wish.

Looking forward to helping make your projects happen. Please help spread the word!

Regards,

Kevin Govender, 0824878466 ■

## partial solar eclipse in january

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from Claire Flanagan, Jhb Planetarium

All of South Africa will experience a partial eclipse of the Sun on Monday 26<sup>th</sup> Jan 2009, from about 7am to 9:30am. This one is definitely worth watching – and it's our last decent national eclipse at a reasonable time of day until 2016.

We have put an eclipse info page onto our website: [www.planetarium.co.za](http://www.planetarium.co.za) Included on this website is info about times and visibilities for South Africa and neighbours, quite a bit about “Eclipse pinhole projection art” – this looks like a very good way to keep kids busy when they're out watching the eclipse (we need to stop them from staring at the Sun and fighting over eclipse viewers), instructions (and worksheet) for a scale model of the eclipse – use a fizz pop (Moon) and a tennis ball (Earth) – hold them 2m apart, and try to get the shadow of the fizz pop on the tennis ball, and more.

Eclipse viewer ordering info, and eclipse visibility around the country, is also available on a cellphone-friendly web-page, [planetarium.co.za/cell](http://planetarium.co.za/cell).

Eclipse details for Johannesburg:  
**Start: 07:06. Maximum (35%): 08:19. End: 09:46. ■**

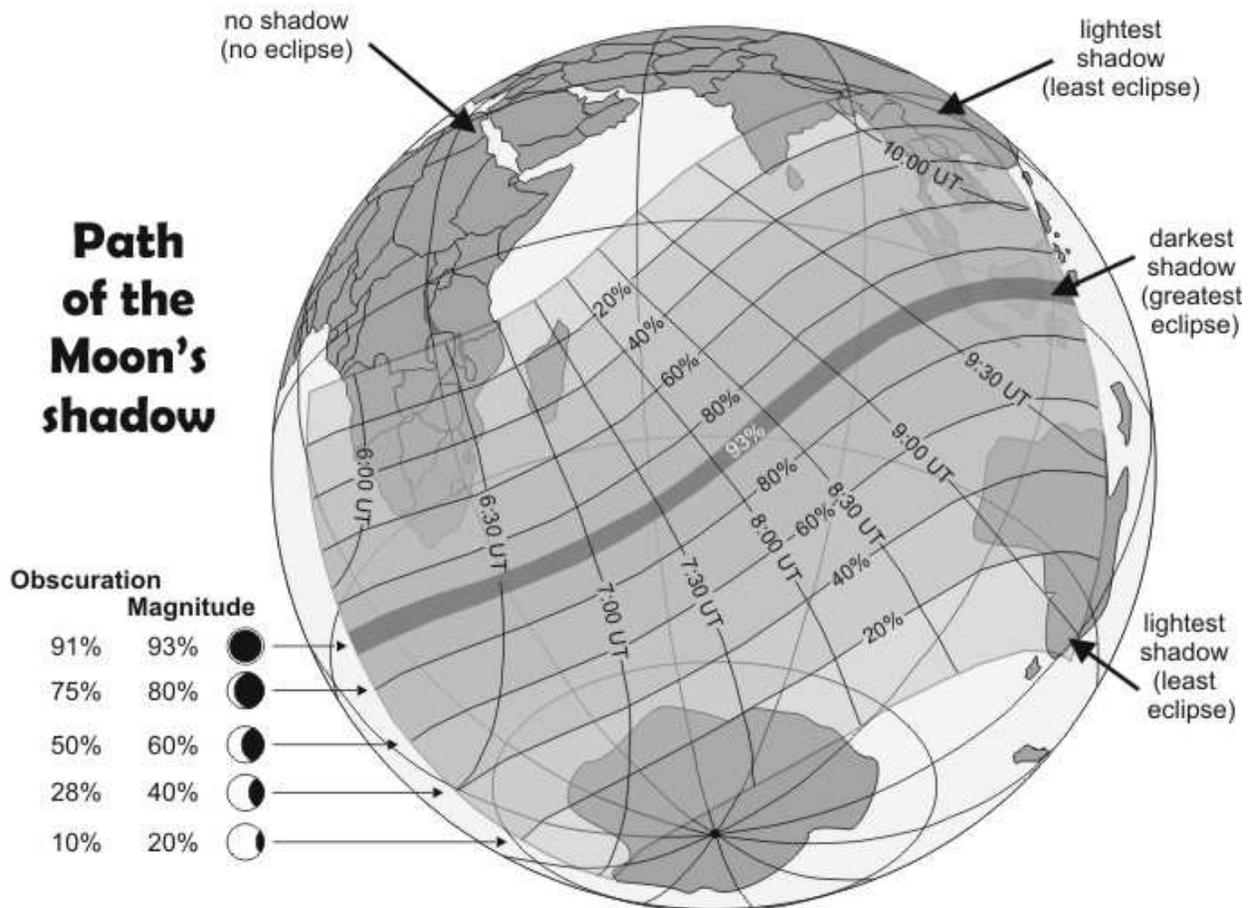
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# PARTIAL SOLAR ECLIPSE

## 2009 JAN 26<sup>TH</sup>

Monday Morning

### Path of the Moon's shadow



Eclipse **magnitude** is the fraction of the Sun's diameter that is covered by the Moon.  
 Eclipse **obscuration** is the fraction of the Sun's area that is covered by the Moon.

Eclipse *magnitude* is easier to use for drawing eclipse diagrams.  
 Eclipse *obscuration* is more realistic: would you call this a 10% eclipse or a 20% eclipse?

**Universal Time (UT)** is an international timescale - it is used by astronomers and other people who need to share information across time-zones. It is the time at the Greenwich Meridian (longitude zero).

The Earth spins from west to east - anti-clockwise as viewed from above the north pole. So the Sun rises earlier for countries east of Greenwich. These countries (Europe, Africa, Asia and Australia) are "ahead of Universal Time". The Americas are "behind UT".

**South Africa** is two hours ahead of UT - we will see the eclipse at about 8:15am South African Time.

Johannesburg Planetarium  
 Wits University  
[www.planetarium.co.za](http://www.planetarium.co.za)  
[info.planet@wits.ac.za](mailto:info.planet@wits.ac.za)  
 ph: 011-717-1390

Western Australia is seven hours ahead of UT - they will see eclipse at about 4:15pm Australian Western Time.

## world first for SA space entrepreneur

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from [www.sagoodnews.co.za](http://www.sagoodnews.co.za), 9 October 2008

South African born entrepreneur, Elon Musk, made history in September when his Falcon 1 rocket became the first privately developed rocket to orbit the Earth.

The Falcon 1 was launched from Kwajalein Atoll Island in the Pacific Ocean on the 28th of September 2008, from where it successfully orbited Earth. Following three failed orbits, this was the Falcon's fourth attempt at achieving the feat and marked the culmination of six years of intense work.

"It's been over six years of extremely intense effort and some pretty heart-wrenching episodes with the prior launches. Really the emotion I feel is much more relief than elation," Musk told reporters after the launch.

Since its establishment in 2002 Musk's company, Space Exploration Technologies (SpaceX), has been developing rockets and spacecraft from its headquarters in Los Angeles, California, that will ultimately compete with world governments in providing spacecraft for missions to the International Space Station and beyond.

Musk matriculated from Pretoria Boys High in 1988 before leaving for America in order to avoid military conscription in South Africa. SpaceX is the 37-year old entrepreneur's third company, having previously founded PayPal, an electronic payment system, and Tesla Motors, a Silicon Valley automobile start-up.

Musk, who has invested more than US\$100 million (almost R1 billion) in SpaceX, believes that his cheap and reliable rockets will successfully carry cargo to the ISS by 2010, thus forging the way for a new market in private and commercial space transport. The company expects to carry astronauts to space at a later stage.

According to the San Francisco Chronicle NASA and other space officials are welcoming the change that SpaceX could bring to the space industry because they see private space travel as the wave of the future since it promises to be much cheaper.



Falcon 1 Flight 4 vehicle on the launch pad at Omelek island, Kwajalein Atoll. Photo © 2008 Space Exploration Technologies Corp.

"Rocket science truly is one of the hardest things humans can do, but the technology to transport cargo to the station is mature enough that we strongly believe private enterprise can and must step in," NASA Administrator Michael Griffin told the newspaper.

Scientists and astronomers at SpaceX have spent the past week reviewing data from the Falcon 1's flight. Musk's update on the SpaceX website reads, "The mood here at SpaceX is just ecstatic! ... The data has confirmed that the flight went really well, including the coast and restart."

The Falcon 1 didn't carry any cargo for this flight but will carry a Malaysian primary satellite as well as US government secondary satellites to near equatorial orbit on its next flight (Flight 5), scheduled for March 2009.

"Flight 6 will probably be a Defense Department satellite in the summer and Flight 7 a commercial satellite mission in the fall," says Musk. "In 2010, I expect the launch cadence for Falcon 1 to step up to a mission every two to three months."

For more information visit [www.spacex.com](http://www.spacex.com) ■



The critical stage separation sequence began about 2 minutes and 37 seconds into flight with shutdown of the Merlin first stage engine, then separation of the first and second stages, followed by ignition of the Kestrel second stage engine. Photo © 2008 Space Exploration Technologies Corp.

## quantum mechanics for moons

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by Sean Carroll, "Quantum Hyperion" at [www.cosmicvariance.com](http://www.cosmicvariance.com)

One of the annoying/fascinating things about quantum mechanics is the fact the world doesn't seem to be quantum-mechanical. When you look at something, it seems to have a location, not a superposition of all possible locations; when it travels from one place to another, it seems to take a path, not a sum over all paths. This frustration was expressed by no lesser a person than Albert Einstein, quoted by Abraham Pais, quoted in turn by David Mermin in a lovely article entitled "Is the Moon There when Nobody Looks?":

*"I recall that during one walk Einstein suddenly stopped, turned to me and asked whether I really believed that the moon exists only when I looked at it."*

The conventional quantum-mechanical answer would be "Sure, the moon exists when you're not looking at it. But there is no such thing as 'the position of the moon' when you are not looking at it."

Nevertheless, astronomers over the centuries have done a pretty good job predicting eclipses as if there really was something called 'the position of the moon,' even when nobody (as far as we know) was looking at it. There is a conventional quantum-mechanical explanation for this, as well: the correspondence principle, which states that the predictions of quantum mechanics in the limit of a very large number of particles (a macroscopic body) approach those of classical Newtonian mechanics. This is one of those vague but invaluable rules of thumb that was formulated by Niels Bohr back in the salad days of quantum mechanics. If it sounds a little hand-wavy, that's because it is.

The vagueness of the correspondence principle prods a careful physicist into formulating a more precise version, or perhaps coming up with counterexamples. And indeed, counterexamples exist: namely, when the classical predictions for the system in question are chaotic. In chaotic systems, tiny differences in initial conditions grow into substantial differences in the ultimate evolution. It shouldn't come as any surprise, then, that it is hard to map the predictions for classically chaotic systems onto average values of predictions for quantum observables.

Essentially, tiny quantum uncertainties in the state of a chaotic system grow into large quantum uncertainties before too long, and the system is no longer accurately described by a classical limit, even if there are large numbers of particles.

Some years ago, Wojciech Zurek and Juan Pablo Paz described a particularly interesting real-world example of such a system: Hyperion, a moon of Saturn that features an irregular shape and a spongy surface texture.



The orbit of Hyperion around Saturn is fairly predictable; happily, even for lumpy moons, the center of mass follows a smooth path. But the orientation of Hyperion, it turns out, is chaotic - the moon tumbles unpredictably as it orbits, as measured by Voyager 2 as well as Earth-based telescopes. Its orbit is highly elliptical, and resonates with the orbit of Titan, which exerts a torque on its axis. If you knew Hyperion's orientation fairly precisely at some time, it would be completely unpredictable within a month or so. More poetically, if you lived there, you wouldn't be able to predict when the Sun

would next rise.

So - is Hyperion oriented when nobody looks? Zurek and Paz calculate (not recently - this is fun, not breaking news) that if Hyperion were isolated from the rest of the universe, it would evolve into a non-localized quantum state over a period of about 20 years. It's an impressive example of quantum uncertainty on a macroscopic scale.

Except that Hyperion is not isolated from the rest of the universe. If nothing else, it's constantly bombarded by photons from the Sun, as well as from the rest of the universe. And those photons have their own quantum states, and when they bounce off Hyperion the states become entangled. But there's no way to keep track of the states of all those photons after they interact and go their merry way.

So when you speak about "the quantum state of Hyperion," you really mean the state we would get by averaging over all the possible states of the photons we didn't keep track of. And that averaging process - considering the state of a certain quantum system when we haven't kept track of the states of the many other systems with which it is entangled - leads to decoherence. Roughly speaking, the photons bouncing off of Hyperion act like a series of many little "observations of the wavefunction," collapsing it into a state of definite orientation.

So, in the real world, not only does this particular moon (of Saturn) exist when we're not looking, it's also in a pretty well-defined orientation - even if, in a simple model that excludes the rest of the universe, its wave function would be all spread out after only 20 years of evolution. As Zurek and Paz conclude, "Decoherence caused by the environment ... is not a subterfuge of a theorist, but a fact of life." (As if one could sensibly distinguish between the two.) ■

## astro news: a new type of pulsar

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NASA Science News, 17 October 2008

About three times a second, a 10,000-year-old stellar corpse sweeps a beam of gamma-rays toward Earth. Just discovered by NASA's Fermi Gamma-ray Space Telescope, the object, called a pulsar, is the first one known that "blinks" in pure gamma rays.

"This is the first example of a new class of pulsars," says Stanford University's Peter Michelson, principal investigator for Fermi's Large Area Telescope. "[We think] it will give us fundamental insights into how these collapsed stars work."

Pulsars were first discovered in 1967 by student radio astronomer Jocelyn Bell and her thesis advisor Tony Hewish. The radio pulses they recorded were uncannily steady--so much so that some astronomers wondered if they were picking up signals from extraterrestrial civilizations. The correct explanation was even stranger: Pulsars are spinning neutron stars packing the mass of the sun into a sphere about 20 km across. Whirling around thousands of times each hour, they beam radio pulses into the cosmos in the style of a rapidfire lighthouse.

Since then, about 1800 pulsars have been discovered mainly via their radio emission. A fraction of pulsars go beyond radio; they also emit pulses of visible light, X-rays, and even high-energy gamma-rays. This discovery by Fermi is different because it is a purely gamma-ray pulsar. The star is silent across parts of electromagnetic spectrum where pulsars are normally found and hints at a whole population of previously unsuspected pulsars waiting to be picked out of the heavens.

The gamma-ray-only pulsar lies within a supernova remnant known as CTA 1 located about 4,600 light-years away in the constellation Cepheus. Its lighthouse-like beam sweeps Earth's way every 316.86 milliseconds. The pulsar, which formed in a supernova explosion about 10,000 years ago, emits 1,000 times the energy of our sun.

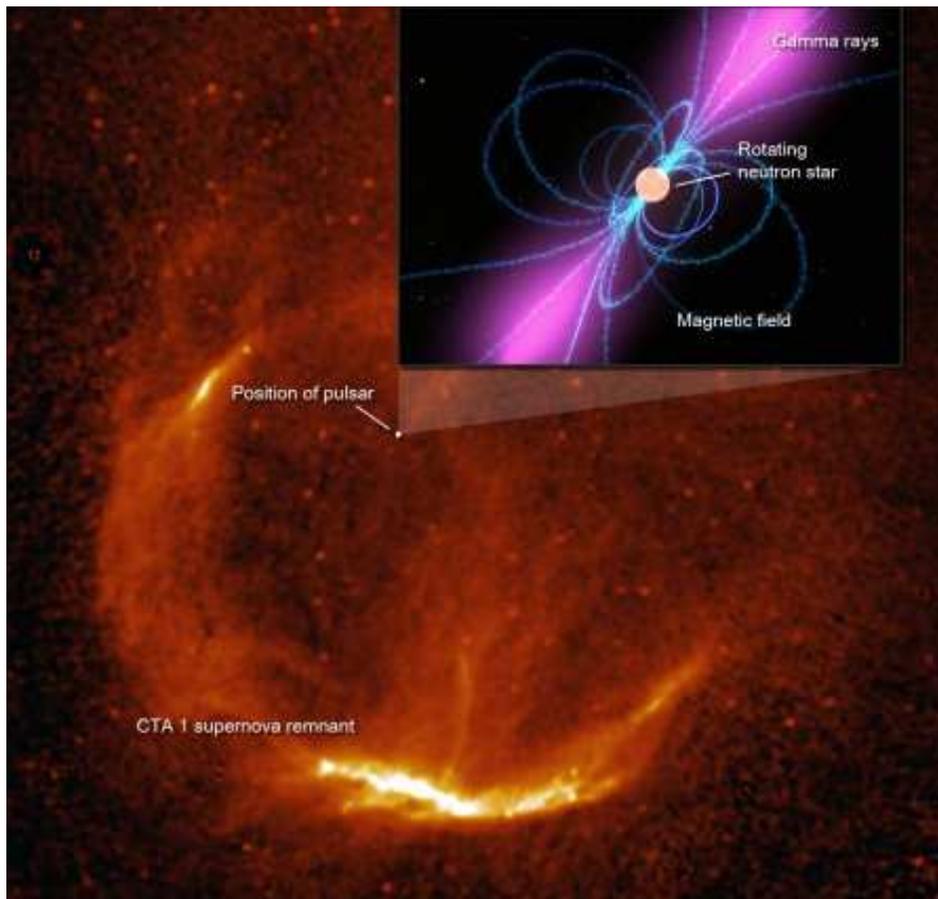
"The Large Area Telescope provides us with a unique probe of the galaxy's pulsar population, revealing objects we would not otherwise even know exist," says Fermi project scientist Steve Ritz of the Goddard Space Flight Center.

The pulsar in CTA 1 is not located at the center of the supernova's expanding gaseous shell. Supernova explosions can be asymmetrical, often imparting a "kick" that sends the neutron star careening through space. Based on the remnant's age and the pulsar's distance from its center, astronomers believe the neutron star is moving at about a million miles per hour -- a typical speed for neutron stars.

Fermi's Large Area Telescope scans the entire sky every three hours and detects photons with energies ranging from 20 million to more than 300 billion times the energy of visible light.

"This observation shows the power of the Large Area Telescope," Michelson adds. "It is so sensitive that we can now discover new types of objects just by observing their gamma-ray emissions."

*A paper about the new pulsar appears in the Oct. 16 edition of Science Express.* ■



**Above:** The pulsar is not located at the center of the surrounding supernova remnant CTA 1. Inset: An artist's concept of the newly discovered pulsar. Clouds of charged particles move along the pulsar's magnetic field lines (blue) and create a lighthouse-like beam of gamma rays (purple).

## **“Star Gazer’s Deep Space Atlas, Outdoor edition”**

**A complete and detailed star atlas to study the night sky.**

Published by amateur astronomer Wayne Mitchell, a member of the Pretoria Astronomy Society.

It is a detailed sky atlas of all the stars and celestial objects (with all the relevant information) that you can locate with a pair of binoculars and telescopes up to 12". If you want to learn the sky or find the thousands of magnificent celestial objects up there among the stars you will definitely need the atlas. The atlas is the only one of its kind for the Southern Hemisphere. It is especially made for use outdoors, wire bound and laminated.

The atlas is currently being reviewed by the South African Astronomical Observatory and has been acknowledged by the Chairman of the Pretoria Astronomy Society

### **Acknowledgement :**

#### **Star Gazer’s Deep Sky Atlas.**

This atlas, written by a knowledgeable amateur astronomer, should fulfill a need for beginners who wish to learn the constellations and for observers with telescopes who are looking for challenges. The layout, with an introduction, some all-sky maps and then a map for each individual constellation, is very convenient. Details of naked eye objects are given, as are details of objects that can be seen with binoculars. Many objects for the telescope are listed, including double stars, open and globular clusters, and planetary nebulae. People who wish to capture galaxies are well catered for, as numerous targets are provided. The “Author’s Notes” add a personal touch, and show how enjoyable astronomy can be.

Michael Poll

Astronomical Society of Southern Africa, Pretoria Centre

Cost: Christmas special @ R395.

Contact Wayne Mitchell at email: waynemit@webmail.co.za or Cell: 072 465 7739. ■

## focus on: A lone planetary in the Flamingo

by Magda Streicher



Photo: Lucas Ferreira using a Pentax K110D SLR through a 200mm (8") Newtonian Sky-Watcher telescope. 6x1min exposures, stacked using Deepsky Stacker (Total exposure time: 6min). ISO: 1600. Final edit in Adobe Photoshop CS3

Grus is probably one of the most beautiful constellations that the Southern Hemisphere has laid at our front door. The slender Y shape displays mainly 3- and 4-magnitude stars, with the sparkling 2-magnitude Alfa and Beta the exceptions. Beta Grus shines with an outstanding yellow/orange colour. Of course Delta<sup>1</sup> and Delta<sup>2</sup>, at 3.9 and 4.1 brightness respectively, form a beautiful naked-eye double star, but a dark night sky is recommended for splitting them with the naked eye.

Grus has only one planetary to offer, which was mistakenly catalogued twice in early 19th century, having been independently discovered by the Australian astronomer Walter Gale and Lewis Swift.

IC 5148/50 is a beautiful object which simply invites a visit through any telescope. The ghostly round nebula 1.8' annulus appears knotty and very uneven with a definite brightening along the NW and SE edges (16" S/C 290x). The hollow central area appears mottled and, with averted vision, slightly dusty. I could not detect the central star which, surprisingly, shows up well in photographs, and I am not the only one who has admitted to that.

The planetary hosts a slightly yellow 11-magnitude star 4' to its south, in a lovely field of view with myriads of faint stars. On one of Brian Skiff's southern visits to Chile in 1993 he called it "a southern showpiece". Skiff is an astronomer at Lowell Observatory and during his southern visit he made use of a 15 cm refractor. He noted that UHC and OIII filters gave similar contrast enhancements, but that the UHC was better at showing the annularity, which was subtle. However, the soft smoke ring never fails to impress me and seeing that the constellation Grus, the lovely Flamingo or Crane, has only one planetary to offer, so if you had the opportunity, do not let it past you by. Another way is to read about all the wonderful objects in the night sky, so to visualize in your minds eye. ■

Name	Type	RA	DEC	Magnitude	Size
IC: 5148/50 PK 2-52.1	Planetary Nebula	21h59m.5	-39°23'08"	11	120"



AN OBSERVATORY CLASS  
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THE SAME.



**SkyScout™**  
Personal Planetarium



[www.celestron.com/skyscout](http://www.celestron.com/skyscout)

#### DISCOVER

The SkyScout is a revolutionary handheld device that uses advanced GPS technology with point and click convenience to instantly identify thousands of stars, planets, constellations and more, providing an educational and entertaining tour through the night sky.

#### EXPLORE

Simply point the SkyScout at any star in the sky and click the "target" button. The SkyScout will instantly tell you what object you are looking at. To locate a star or planet, select the object's name from the menu and follow the directional arrows through the viewfinder. SkyScout tells you when you are on target. It's that easy!

#### LEARN

Once you have targeted an object the real fun begins. The SkyScout includes entertaining and educational audio and text information, including facts, trivia, history and mythology about our most popular celestial objects. A fun learning tool for all ages, the SkyScout personal planetarium puts the knowledge of an expert astronomer in the palm of your hand.

SKYSCOUT PERSONAL PLANETARIUM

 **CELESTRON®**

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