New Zenith

The Monthly Magazine of the Vectis Astronomical Society

Vol 19 Issue 11 — February 2011

When Printed, this Newsletter costs VAS at least £1

Society News

Well we started 2011 with a bit of a bang! The Live Stargazing event held in conjunction with the BBC television programmes was a great success despite the bad weather.

Although nobody counted the turnout exactly, we are confident that around 100 souls braved the wind and rain to find out what VAS does in that funny looking building in Watery Lane.

I'd very much like to build on this event by holding similar regular functions each year.

Once again, thanks to everyone who helped with the event and in particular Elaine Spear for her meticulous planning.

Please note that to enable on time printing of NZ next month, any articles etc MUST be received by 6th Feb 2011 at the very latest.

Clear Skies
Brian Curd

VAS Website: www.wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor New Zenith
35 Forest Road
Winford
Sandown PO36 0JY

Tel: **01983 864303** or email: **editor@wightastronomy.org**

Material for the next issue by the 6th of the month please.

VAS Registered Office

Castle Haven Cottage, Castle Haven Lane, Niton Undercliff, Isle of Wight, PO38 2ND

Registered Charity No 1046091

Observatory Diary

Monday, 19.30hrs	**Members Only**. Telescope and night sky training.
Thursday, 19.30hrs	**Members and Public**. Informal meeting and observing.

Contents this Month

Monthly Meeting Calendar 2011

Check the website for up to the minute information.

Travel for our monthly speakers is sponsored by:

WIGHTLINK
PART OF ISLAND LIFE

Date	Subject	Speaker
28 Jan	Planets of the Solar System	Christina Brooks
25 Feb	Major Moons of the Solar System	Michael Cull
25 Mar	TBA	TBA
29 Apr	Exoplanets from Hot Jupiters to Habitate Earth	Prof Don Pollacco
27 May	Planetary Nebulae	Owen Brazell
24 Jun	The Transit of Venus 2012	Robin Gorman
22 Jul	Pluto	Greg Smye-Rumsby
26 Aug	Astro-Image Processing	Dr Jon Whitehurst
23 Sep	Accretion Discs? TBC	James Fradgley
28 Oct	TBA	TBA
25 Nov	TBA	TBA

All details correct at time of publication.

New Members

A very warm welcome to our latest new members:

- Mr S. Taylor.
- Mr M. Dover
- Mrs M. Craddock, Mr S. Craddock
- Mr D. Kitching
- Ms A. Orec-Archer
- Mr L. Archer
- Mr R. Walker
- Mr P. Woodall

For Sale

Skywatcher Explorer

Skywatcher Explorer telescope (150p EQ3-2). Purchased a year ago, maybe any aspiring astronomer might be interested. Cost £239, but open to offers.

I can be reached on **291627**.

Brian Mildenhall

Tasco 40-114675 Reflector

Almost new Tasco telescope model 40-114675 675 power 114 mm objective/900 mm focal length 3 x Barlow lens & tripod which I would like to sell for £50.

I can be reached on **404487**.

Jane Williams

Explorers' Tours

Members may be aware that Explorers' Tours provided trips to view eclipses and other astronomical events for many years. They were recently taken over by the Tui Travel group, and they have been put into their 'Adventure' company grouping. They are presently selling tours to the Annular Eclipse in 2012 (U.S.A.) and the Total Eclipse in Australia.

To view the tours and/or order a brochure go to *www.adventurecompany.co.uk* Click on 'brochures' & then on 'astronomy brochures'.

Graham Osborne

Café Scientifique

Mon 7th February 7pm - Fighting Cocks, Arreton

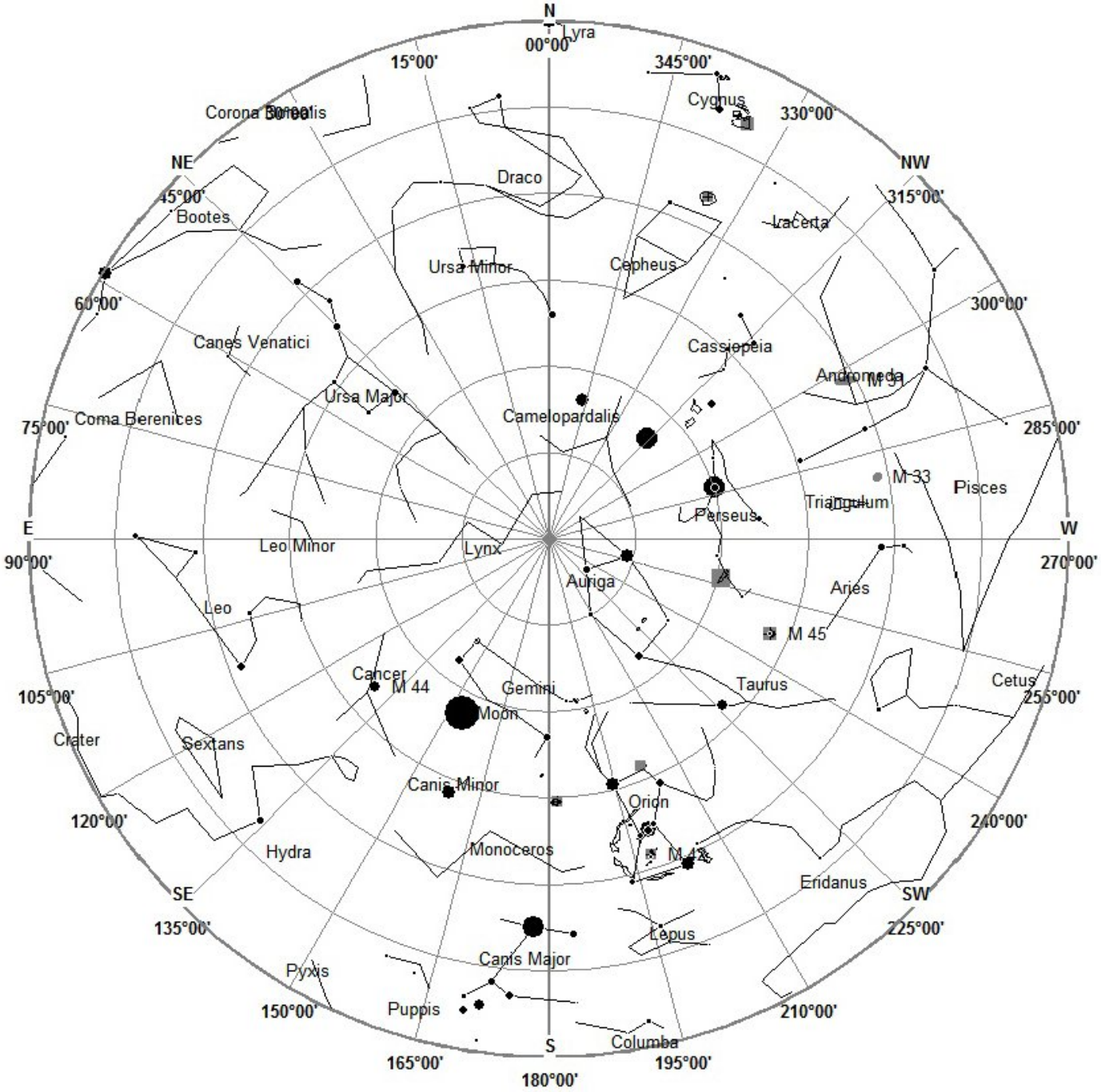
Professor Arnold Taylor who lives on the Island has very kindly offered to give us a talk:

"***How forecastable is the natural world?***"

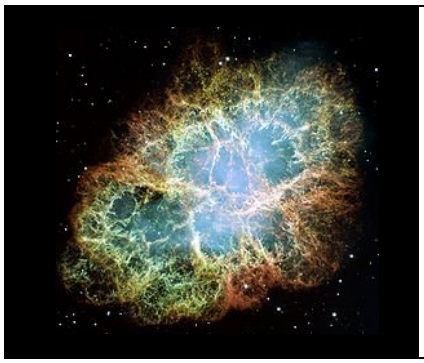
which will be about the effect of global weather patterns on the natural world. This talk will be based on his forthcoming book "The Dance of Air and Sea: How Oceans, Weather and Life Link Together" which will be published by Oxford University Press on February 10. Professor Taylor is a Fellow of the Plymouth Marine Laboratory.

Pam Ash

This Month's Sky Map



View from Newchurch Isle of Wight UK - 2100hrs - 15 February 2011



The Crab Nebula (M1, NGC 1952, Taurus A) is a supernova remnant and pulsar wind nebula in the constellation of Taurus. The nebula was observed by John Bevis in 1731; it corresponds to a bright supernova recorded by Chinese and Arab astronomers in 1054. At X-ray and gamma-ray energies above 30 KeV, the Crab is generally the strongest persistent source in the sky, with measured flux extending to above 1012 eV. Located at a distance of about 6,500 light-years (2 kpc) from Earth, the nebula has a diameter of 11 ly (3.4 pc) and expands at a rate of about 1,500 kilometers per second.

This Month's Night Sky

Moon Phases

New	1st Qtr	Full	Last Qtr
3rd	11th	18th	24th

Planets

Mercury

This month sees Mercury on the opposite side of the Sun to the Earth, so is not visible to us.

Venus

Venus is conspicuous close to the south eastern horizon in the hours before sunrise. It is however noticeably lower than at the beginning of the year. The best of this apparition is past, but the show is not over yet. Look for the thin crescent moon passing close by as this month ends and the next begins.

Mars

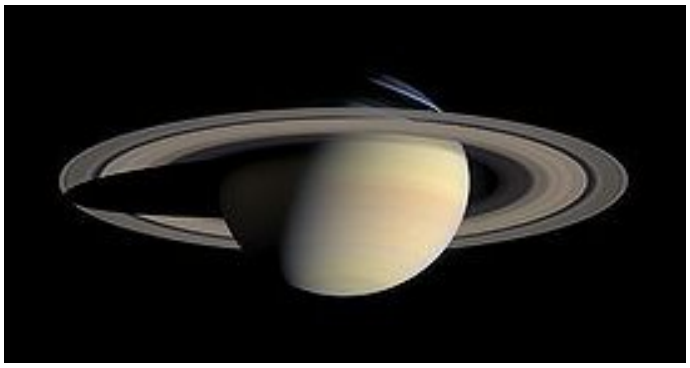
Like Mercury, Mars is on the other side of the sun from us and is unobservable.

Jupiter

As the sky darkens Jupiter will be visible shinning brightly low in the southwest until it sets a few hours later. Although the planet may be bright it is being viewed through a great deal of turbulent air making it difficult pick out the fine detail in the atmosphere. This may be your last chance to see how the southern equatorial belt is recovering its former glory after last years fade.

Saturn

For those able to stay up late Saturn is well placed for observation. From our perspective relatively high up in the northern hemisphere this year's apparition is not one of the best; but with a peak elevation of about 35 degrees it is better than it will be over the next few years when those in the southern hemisphere take their turn at having the best views.



Uranus & Neptune

Both of these outer planets are unfavourably placed for observation this month.

Occultations

On the 19th at 23:52 the 4th magnitude star 87 Leonis reappears from behind the almost full moon.

Deep Sky objects

M1 Crab Nebula, Supernova Remnant RA 5h 35m Dec 22° 1' mag 8.4

It must be remembered that Charles Messier's catalogue is a list of objects that could be mistaken for comets, not a list of must see obejects in the night sky. Many of them can be a dissapointment to the casual observer. The first entry in the catlaogue the crab nebual is one of these, it could easily be taken for a tailless comet. In a small telscope it appears as an oval smudge with no detail, larger intruments do however show some mottling. The remains of the star which exploded in 1054 and was recorded by the Chinese is a 16th magnitude neutron star in the heart of the nebula spinning at 30 times per second. Despite its visual appearance this obeject is one of the most studied in the night sky, it is a nearby natural particle accellerator that dwarfs anything we can create here on Earth.

M50 Open Cluster RA 7h 3m Dec -8° 24' mag 7

This cluster contains about 200 stars spread out over an area of sky approximately the same as that of the full moon. To the visual observer the edge is not clearly defined, further from the centre the star density gradually reduces and the cluster just fades to the background. An easy binocular object.

M48 Open Cluster RA 8h 14m Dec -5° 49' mag 5.5

M48 Is one of the 'lost' Messier objects, at the original coordinates there is no object to be found. It is believed that the great comet hunter made an error in either his records or calculations and that this is the object he actually observed. Under dark skies it can be seen with the naked eye and several stars can be resolved even on binoculars. A telescope shows what has been variously described as an arrowhead or boomerang shaped collection of stars.

NGC2169 RA 6h 9m Dec 13° 58' mag 5.9

This cluster is easily visible in binoculars as a small parallelogram. Increasing the magnification to about 100 with a small telescope will reveal that the stars spell out this cluster's popular name, the '37' cluster. The 7 is quite clear if you can see down to magnitude 11, the 3 is less obvious but is there with a little imagination.

Peter Burgess

Island Mathematical Institute

The inaugural meeting of the Isle of Wight Mathematical Institute will be in the classroom at Fort Victoria on Thursday 17th February starting at 7.30pm.

This meeting will set up the society and there will be a general discussion "One, two, three, many. - Numbers?" If you want to come along please email me or ring 761555.

Meantime here's a little puzzle to get you thinking....

The first mathematician to introduce a symbol for the unknown was Diophantus, who used the Greek letter sigma ζ. He is remembered as the father of algebra.

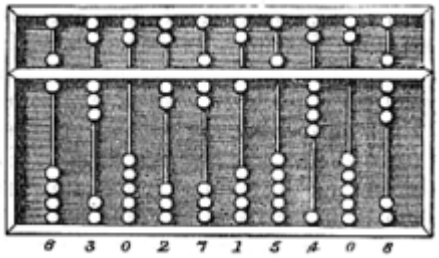
Diophantus lived in Alexandria sometime between the first and third centuries CE. Nothing is known of his personal life except for the following riddle, which appeared in a Greek collection of puzzles and is said to have been inscribed on his tomb:

"God vouchsafed that he should be a boy for a sixth part of his life; when a twelfth was added, his cheeks acquired a beard; He kindled for him the light of marriage after a seventh, and in the fifth year of his marriage He granted him a son. Alas! Late-begotten and miserable child, when he had reached the measure of half his father's life, the chill grave took him. After consoling his grief by the science of numbers for four years he reached the end of his life."

So how old was Diophantus when he died?

A planetarium family ticket will be given to first three correct solutions received by e-mail:

mail@paul-england.co.uk



Let's Hope it Works this Time.....

Despite the skepticism, a small community of scientists is still investigating near-room-temperature fusion reactions. The latest news occurred last week, when Italian scientists Andrea Rossi and Sergio Focardi of the University of Bologna announced they developed a cold fusion device capable of producing 12,400W of heat power with an input of just 400W. Last Friday, the scientists held a private invitation press conference in Bologna, attended by about 50 people, where they demonstrated what they claim is a nickel-hydrogen fusion reactor. Further, the scientists say that the reactor is well beyond the research phase; they plan to start shipping commercial devices within the next 3 months and start mass production by the end of 2011.

The Claim

Rossi and Focardi say that, when the atomic nuclei of nickel and hydrogen are fused in their reactor, the reaction produces copper and a large amount of energy. The reactor uses less than 1g of hydrogen and starts with about 1kW of electricity, which is reduced to 400W after a few minutes. Every minute, the reaction can convert 292 grams of 20°C water into dry steam at about 101°C. Since raising the temperature of water by 80°C and converting it to steam requires about 12.4kW of power, the experiment provides a power gain of 12,400/400 = 31. The scientists estimate that electricity can be generated at a cost of less than 1 cent/kWh, which is significantly less than coal/gas plants.

"The magnitude of this result suggests that there is a viable energy technology that uses commonly available materials, that does not produce CO_2, and that does not produce radioactive waste and will be economical to build," according to this description of the demonstration.

Rossi and Focardi explain that the reaction produces radiation, providing evidence that it is indeed a nuclear reaction and does not work by some other method. They note that no radiation escapes due to lead shielding, and no radioactivity is left in the cell after it is turned off, so there is no nuclear waste.

The scientists explain that the reactor can be operated by following a set of instructions. Commercial devices would produce 8 units out per unit in to ensure safe and reliable conditions, even though higher output is possible, as demonstrated. Several devices can be combined in series and parallel arrays to reach higher powers, and the scientists are currently manufacturing a 1MW plant made with 125 modules. Although the reactors can be self-sustaining so that the input can be turned off, the scientists say that the reactors work better with a constant input.

Read more here - Physorg.com

The Big Questions in Cosmology

Monthly Meeting Report 26 November 2010 - Dr. Stephen Sergeant. Dept. of Physics and Astronomy, Open University.

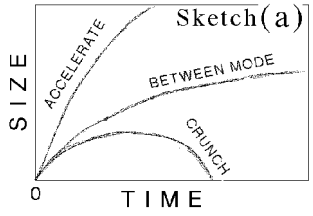
This talk was packed with diagrams and information, dovetailing into a discussion needing no prompting. The pictures given here are sketches of what was seen on screen, viewed from afar, giving a mere flavour of all the data presented.

The big questions are: What is the fate of the Universe? What is it mostly made of? How did it get as it is? How old is it? And... will we get the answers in our lifetimes? Currently this is a very exciting time, "things are happening".

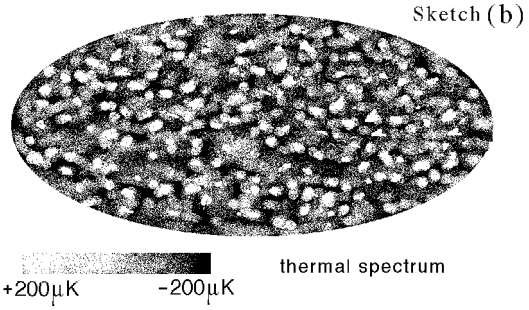
Starting with a picture of M31, it was asked which is the furthest and nearest parts of the disc? - the 'give-away' is a black streak of dust which has to be on the near side - dust does a lot of obscuring...more later.

A beautiful story of ruling out many negatives concerns the discovery of the cosmic microwave background noise (CMB) by Penzias & Wilson in 1965. The signal received in a microwave horn was NOT caused by the solar system, or the nuclear test of 1962, or ET radio sources and nor was it radio noise from New York or a 'white dielectric' deposited by pigeons in the receiving horn.

Sketch (a): The universe will either end in a Big Crunch, or expand for ever, or hover in between, depending on how much matter there is in the Universe, given by Ω_0.

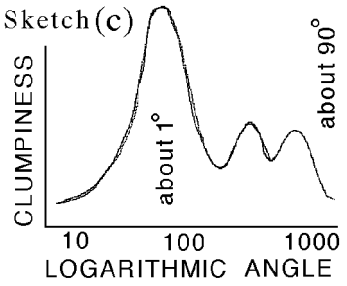


Sketch (b): ripples in the microwave background - the fluctuations in the thermal spectrum enable a value for Ω_0 to be obtained, as fluctuations cause clumping by gravitational attraction.



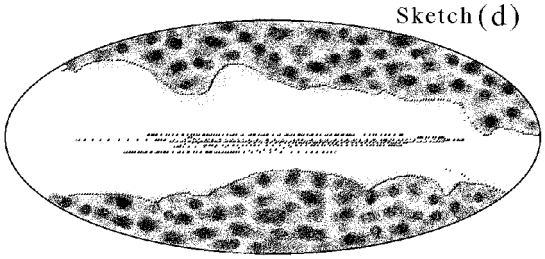
Looking back in time, through the transparent universe, eventually we reach an 'opaque fog' out there, which is receding. In the fog, photons are scattered and re-emitted.

Sketch (c): Further 'structural' data from WMAP on ripple statistics and clumpiness of about one degree, gives more calculations of Ω_0. The physical limit is the horizon, a sphere of influence since the Big Bang, or technically since the end of inflation. The whole Universe is a resonating cavity, the notes at which it 'goes bong' gives the wavelengths in metres of the ripples and data on composition, plus how big the structure should be on the sky and how much expansion has happened.



The Planck European Satellite has given the best measurements of polarized and unpolarized data on the CMB. Talking of what it all means leads to physics, and this "places the greatest demands on one's brain when grasping at quantum mechanics and relativity" - quoting historically someone who said "A new scientific truth does not triumph by convincing opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it."

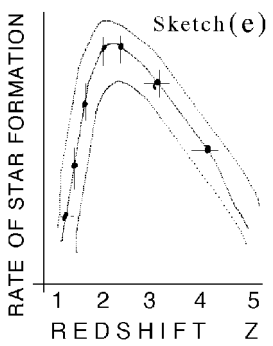
Sketch (d): relates to a recent release of a CMB picture, not subtracting out the Milky Way.



The Hubble Deep Field Camera has revolutionized the study of galaxies. Putting this into historical context, the idea of curved space-time arose in 1915 with Einstein. He tried to make a self-consistent model of the entire Universe - quite a novel idea - homogenous and isotropic, but to keep it stationary, preventing it collapsing in a big crunch or flying apart, he introduced a 'cosmological constant, lambda', later describing it as 'his biggest blunder' because Hubble discovered that the Universe is indeed expanding. It was Hubble's brilliant idea to find out what observations would yield. The HST can see ninety-percent of the way back to the Big Bang, giving cosmologists access to physics beyond particle physics, when the first blobs can be seen with galaxies in a state of formation.

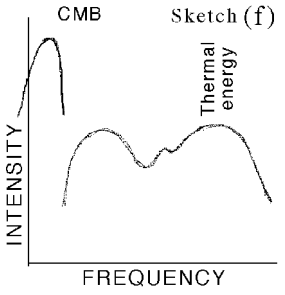
Sketch (e): gives the rate of star formation (units were in number of stars per year per cubic megaparsec) as a function of the cosmological redshift z, or the age of the Universe. This redshift is caused by the 'stretching of

space' and is not the same as Doppler shift, which operates locally.

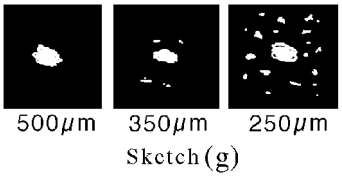


It turns out there is a lot more light in the early Universe and we don't know what generated it - this will be targeted by the next generation of satellites. It is not often that portraits tell a scientific story, but when it comes to light, a portrait of Herschel contains items relating to infrared, including: a prism, a thermometer, a control experiment, and differential thermometry. So the huge current interest in studying dusty galaxies in the infra-red, is historically connected to Herschel's work.

The WFC3 & Hubble UDF cameras have given the deepest ever maps with a redshift going as far as z=8. Dusty galaxies in the early universe tell a parallel story as the ones seen optically.

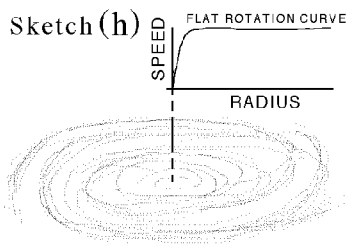


Sketch (f): shows the connection between the CMB and the optical frequencies, with thermal or infrared radiation filling the frequency spectrum between - the region where dusty galaxies are studied. For every two optical quanta that are emitted, one of them is absorbed by dust.



Sketch (g): A Japanese team of astronomers, with impressive martial arts skills too, have been studying galaxies at three infra-red wavelengths. The Herschel Space Observatory used in these studies was launched along with the Planck satellite.

The stars of Orion, when studied at infra-red wavelengths, become transformed into what appears as brilliant sparks within a bonfire of red and yellow flames (no sketch provided!)



The Universe seen in infrared is diffraction-limited even using a 15m telescope, when long wavelengths, such as 1mm, give significant diffraction. The subject matter moved rapidly from high-z supernovae being too faint, to the Akari telescope launch... but just time for Sketch (h) a flat rotation curve of a galaxy, interpreted as demonstrating the existence of a halo of dark matter that cannot be seen but inferred, also inferred from gravitational lensing. What could this dark matter be? - perhaps, wimps, neutrinos, machos, etc "We should know in a few years" and, quoting the Astronomer Royal, "this is the Golden Age of cosmology". The discussion, needing no prompting, covered questions such as "if the universe is expanding what will happen when it collides with other expanding pieces of the multiverse?"

Puzzle Corner.

1. Why is the 'melon map' of sketch (b) twice the width compared to its height?

2. Since Einstein described his 'cosmological constant' as his 'biggest blunder', why isn't it omitted altogether from modern cosmology?

3. Why does gravitational lensing produce focussed rings, rather than 'defocussed fuzz'?

4. In sketch (f) how does the CMB join with the infrared? If there's a null, would this give a usable communications window where it might be useful to search for signals from ETI, for example?

5. In sketch (a), what instructions would an artist need on how to continue sketching the 'between mode' curve to the right without it becoming a static universe, a big bang or a big crunch?

Dr.Guy Moore

Dr Moore has also very kindly completed an index to the 2010 editions of NZ. I am making a few small edits to the file and when complete I'll make it available for download.

Brian

NASA prepares to launch next Earth-observing satellite mission

Glory will help scientists understand the influence of aerosols on the energy balance of our planet.

Glory will fly in a low-Earth orbit of 438 miles (705 km) altitude, which is about the distance between Boston and Washington. Photo by NASA

NASA's newest Earth-observing research mission is nearing launch. The Glory mission will improve our understanding of how the Sun and tiny atmospheric particles called aerosols affect Earth's climate. Glory also will extend a legacy of long-term solar measurements needed to address key uncertainties about climate change.

Glory is scheduled to launch from Vandenberg Air Force Base in California February 23 at 5:09 a.m. EST. It will join a fleet called the Afternoon Constellation (A-train) of satellites. This group of other Earth-observing satellites, including NASA's Aqua and Aura spacecraft, flies in tight formation.

"Glory is going to help scientists tackle one of the major uncertainties in climate change predictions identified by the United Nation's Intergovernmental Panel on Climate Change: the influence of aerosols on the energy balance of our planet," said Michael Freilich from NASA Headquarters in Washington, D.C. "This mission also marks the first satellite launch under President Obama's climate initiative that will advance the United States' contribution to cutting-edge and policy-relevant climate change science."

Originally confirmed in 2005, Glory has been developed by a team of engineers and scientists at several government, industry, and academic institutions across the country. The Glory spacecraft arrived at Vandenberg January 11 after a cross-country road trip from Orbital Sciences Corporation in Dulles, Virginia.

"The spacecraft is in place at the launch, and all of the post-shipment inspections and electrical tests have been completed," said Bryan Fafaul from Goddard Space Flight Center in Greenbelt, Maryland. The spacecraft will be mated to Orbital's Taurus XL 3110 rocket next month.

Glory will carry new technology designed to unravel some of the most complex elements of Earth's system. The mission carries two primary instruments, the Aerosol Polarimetry Sensor (APS) and the Total Irradiance Monitor (TIM). APS will improve measurement of aerosols, the airborne particles that can influence climate by reflecting and absorbing solar radiation and modifying clouds and precipitation.

TIM will extend a decades-long data record of the solar energy striking the top of Earth's atmosphere, or total solar irradiance. APS will collect data at nine different wavelengths, from the visible to short-wave infrared, giving scientists a much-improved understanding of aerosols. The instrument, NASA's first Earth-orbiting polarimeter, will help scientists distinguish between natural and human-produced aerosols. The information will be used to refine global climate models and help scientists determine how our planet is responding to human activities.

The TIM instrument will maintain and improve upon a 32-year record of total solar irradiance, a value that fluctuates slightly as the Sun cycles through periods of varying intensity approximately every 11 years. While scientists have concluded that solar variability is not the main cause of the warming observed on Earth in recent decades, the Sun has historically caused long-term climate changes. Having a baseline of the solar energy that reaches Earth gives us a way to evaluate future climate changes. Better measurements of total solar irradiance give scientists another way to test their climate models and understand the Sun's longer cyclical changes and how they may impact the climate.

Glory will fly in a low Earth orbit at an altitude of 438 miles (705 kilometres), about the distance from Boston to Washington. After launch, mission operators will conduct verification tests for 30 days and then begin to collect data for at least 3 years.

Glory's Taurus launch rocket also will carry into orbit a secondary payload: NASA's Educational Launch of Nanosatellite (ELaNA) mission. This mission will put three small research satellites, or CubeSats, into orbit for Montana State University, the University of Colorado, and a consortium of state universities called Kentucky Space.

NASA Headquarters, Washington, D.C.
Published: January 21, 2011

The Orion Nebula is still full of surprises

Despite its familiarity and closeness, there is still much to learn about this stellar nursery.

This new image of the Orion Nebula was captured using the Wide Field Imager camera on the MPG/ESO 2.2-meter telescope at the La Silla Observatory, Chile. This image is a composite of several exposures taken through a total of five different filters. ESO/Igor Chekalin

This ethereal-looking image of the Orion Nebula was captured using the Wide Field Imager on the MPG/ESO 2.2-meter telescope at the La Silla Observatory in Chile. This nebula is more than just a pretty face, offering astronomers a close-up view of a massive star-forming region to help advance our understanding of stellar birth and evolution. Igor Chekalin of Russia, who participated in the European Southern Observatory's (ESO) Hidden Treasures 2010 astrophotography competition, selected the data used for this image. Igor's composition of the Orion Nebula was the seventh-highest ranked entry in the competition, although another of Igor's images was the eventual overall winner.

The Orion Nebula (M42) is one of the most easily recognizable and best-studied celestial objects. It is a huge complex of gas and dust where massive stars are forming and is the closest such region to Earth. The glowing gas is so bright that it is visible with the unaided eye and is a fascinating sight through a telescope. Despite its familiarity and closeness, there is still much to learn about this stellar nursery. It was only in 2007, for instance, that the nebula was shown to be closer to us than previously thought — 1,350 light-years rather than about 1,500 light-years.

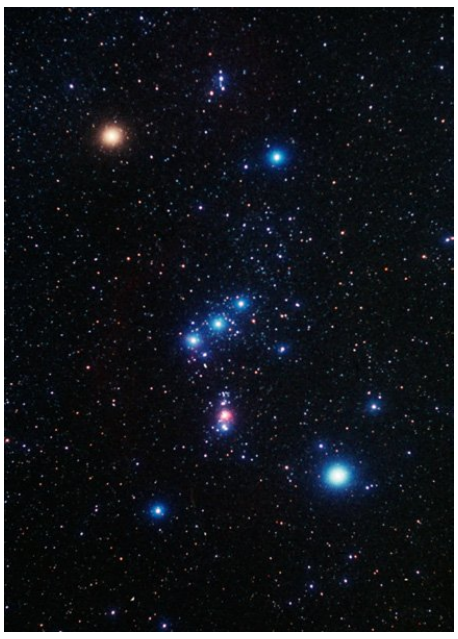
Astronomers have used the Wide Field Imager on the MPG/ESO 2.2-meter telescope at ESO to observe the stars within M42. They found that the faint red dwarfs in the star cluster associated with the glowing gas radiate more light than had previously been thought, giving us further insights into this famous object and the stars that it hosts. The data collected for this science project, with no original intention to make a colour image, have now been reused to create the richly detailed picture of M42 shown here.

The image is a composite of several exposures taken through a total of five different filters. Light that passed through a red filter as well as light from a filter that shows the glowing hydrogen gas were colored red. Light in the yellow-green part of the spectrum is colored green, blue light is colored blue, and light that passed through an ultraviolet filter has been colored purple. The exposure times were about 52 minutes through each filter.

Chekalin was awarded the first prize of the competition for his composition of M78, and he also submitted an image of NGC3169, NGC3166, and SN 2003cg, which was ranked second-highest.

ESO's Hidden Treasures 2010 competition gave amateur astronomers the opportunity to search through ESO's vast archives of astronomical data, hoping for a well-hidden gem that needed polishing by the entrants. Participants submitted nearly 100 entries, and 10 skilled people were awarded some extremely attractive prizes, including an all-expense-paid trip for the overall winner to ESO's Very Large Telescope on Cerro Paranal, in Chile, the world's most advanced optical telescope. The 10 winners submitted a total of 20 images that were ranked as the highest entries in the competition out of the near 100 images.

ESO, Garching, Germany
Published: January 19, 2011



THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

News and Events

Member's Photograph - Andromeda Galaxy

TMB 80/480 Piggybacked on a 8" Meade LX-90 GPS with standard wedge Meade DSI IIIc with Tele Vue TRF-2008 Focal Reducer spaced at 57mm and Hutech IDAS LPS-2 filter. Autoguided using LX-90 with Astro Engineering .6x reducer & DSIc with 2.0S update rate in PHD (via GPUSB & APM)

24x240S Subs, Dark subtract done on the fly in Envisage, hand picked subs, flat frame, bias calibration and stacking done in AIP4Win 2.2 for each individual LRGB channel. Calibrated channels wavelet noise filtered, exponentially stretched, registered and joined in AIP4WIN 2.2 using the join colours tool. Final finishing in Photoshop with a slight gamma curve and colour correction.

Taken on 10-11-2010 by member Jon Whitehurst

Cosmology standard candle not so standard

Astronomers have turned up the first direct proof that "standard candles" used to illuminate the size of the universe, termed Cepheids, shrink in mass, making them not quite as standard as once thought. The findings, made with NASA's Spitzer Space Telescope, will help astronomers make even more precise measurements of the size, age and expansion rate of our universe. Standard candles are astronomical objects that make up the rungs of the so-called cosmic distance ladder, a tool for measuring the distances to farther and farther galaxies. The ladder's first rung consists of pulsating stars called Cepheid variables, or Cepheids for short. Measurements of the distances to these stars from Earth are critical in making precise measurements of even more distant objects. Each rung on the ladder depends on the previous one, so without accurate Cepheid measurements, the whole cosmic distant ladder would come unhinged.

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Observatory

For your own safety, when visiting the VAS observatory, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith welcomes letters, articles or pictures related to all aspects of astronomy. Contributions to the Editor at the email or postal address on the front page.

"All truths are easy to understand once they are discovered; the point is to discover them."

Galileo Galilei

Quotations

"Nature uses as little as possible of anything."

Johannes Kepler

"The more success the quantum theory has, the sillier it looks."

Albert Einstein

"It is often stated that of all the theories proposed in this century, the silliest is quantum theory. In fact, some say that the only thing that quantum theory has going for it is that it is unquestionably correct."

Michio Kaku