COWICHAN VALLEY STARFINDERS ASTRONOMY CLUB

Clear Skies

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Categories

Quick Links

1. Greetings!

Welcome to the Cowichan Valley StarFinders Astronomy club's "Clear Skies" monthly newsletter.

The ISP planning committee is hard a work getting the details together for our Star Party in September. Duel members are also volunteering their time and energies for the upcomming RASC Star Party which is NEXT WEEKEND (Aug 13-15) in Metchosin. We are a very small island and all the help is greatly appreciated. If you cannot volunteer then make sure you support our local Astronomy club/societies.

We will soon be asking for volunteers to help out in various positions mainly setup and teardown, gate and kids area. So keep an eye on your emails because frankly folks, we can't do this without you.

On another note there hasn't been much viewing in the night sky in the Duncan area and surrounding area, due to the smoke caused by the fires in the interior. My local meterologist has told me that Duncan is a bit of an anonomly as it gets wind from all four directions and the weather kind of "pools" in Duncan. That is why they are the hardest hit with the smoke. Interesting eh?

Many thanks to this month's contributors Moe R and Bryon T. PS I missed saying thanks last month for our PREZ contribution. So thanks this month Paul R.

By Freda Eckstein

" Astronomers, like burglars and jazz musicians, operate best at night"- Miles Kington

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2. Socials

Socials are held on the **4th Wednesday of each month** at the home of Bryon and Freda. See the website for a map.

Please Note: the Socials are **cancelled** **for July and August 2010**; Have a great summer and we will see you at the next Social on September 22nd.

Also keep checking your email for inpromtu Sidewalk Astronomy and Star Parties that will be cropping up this summer.

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Social Highlights –

By Nancy Kirshfelt

The Starfinders meeting for July and August has been cancelled but there is the possibility that some observing nights will be held. The next meeting of the Cowichan Valley Starfinders will be held in September 2010.

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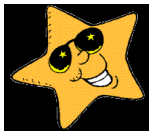
3. Upcoming Events

It is now officially summer and you know what that means? YES STAR PARTIES! The two island star parties are listed below:

August 13-15, 2010
The RASCals Star Party will be held on Southern Vancouver Island
at Metchosin (near Victoria), BC, Canada
For more info refer to the website: http://victoria.rasc.ca/events/StarParty/



September 3-5
Island Star Party will be held at Bright Angel Park, Cowichan Station "The Hub of the Universe" (Near Duncan)B.C., Canada
For more info refer to the website: http://www.starfinders.ca/starparty.htm

For more information on other Western Canadian Star Parties, click on the links below:

Mount Kobau Star Party - Osoyoos - Aug.7-15th
Alberta Star Party - Sept. 10-12th
Northern Prairie Starfest - Edmonton RASC - Sept.7-12th
Saskatchewan Summer Star Party - Cypress Hills Aug.12-15th

Now Playing at the National Geographic IMAX Theatre, Victoria
Dinosaurs Alive
A global adventure of science and discovery -- featuring the earliest dinosaurs of the Triassic Period to the monsters of the Cretaceous "reincarnated" life-sized for the giant IMAX® screen. For show times see website: http://www.imaxvictoria.com/showtimes-rates/index.cfm?movieid=MO_20100415154232685499&publicschool=P

Hubble, Change How You View Our Universe!
Narrated by Leonardo DiCaprio and vividly captured with IMAX technology, HUBBLE recounts the amazing journey of the most important scientific instrument since Galileo's original telescope and the greatest success in space since the Moon Landing. For show times see website: http://www.imaxvictoria.com/index.cfm

NASA Launches credit NASA.Com:

No Launches for August

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4. This Month In History

Courtesy of: Windows to the Universe

September 10 1941 - Stephen Jay Gould's birthday
Stephen Jay Gould was an American paleontologist who was born in 1941. He revised Darwin's theory of evolution, introducing his own concept of punctuated equilibrium.

September 14 1712 - Death of Giovanni Cassini
Giovanni Cassini was Italian-French astronomer who lived between 1625-1712. He discovered that Saturn's Rings are split into two parts, and today the gap between them is called the "Cassini Division". He also discovered four of Saturn's moons.

September 17 1683 - Bacteria discovery
Antony van Leeuwenhoek wrote a letter to the Royal Society describing his discovery of little living "animalcules". This was the first observation of bacteria.

September 23 1846 - Neptune discovery
Neptune was discovered by German astronomer Johann Galle. His observations were prompted by mathematical calculations by French astronomer Joseph Leverrier and English astronomer John Couch Adams.

September 28

1895 - Death of Louis Pasteur
Louis Pasteur was a French chemist who lived between 1822-1895. He discovered germs, and learned that they are responsible for spreading contagious diseases. He created vaccines for rabies and other deadly illnesses, saving many lives.
1953 - Death of Edwin Hubble
Edwin Hubble was an American astronomer who lived between 1889-1953. His observations of galaxies helped him develop the idea of an expanding universe, which forms the basis of modern cosmology. He also discovered a relationship between a galaxy's speed and its distance.

September 29 1839 - Death of Friedrich Mohs
Friedrich Mohs was a German scientist who studied minerals. He lived from 1773 to 1839. Friedrich created a scale from one to 10 to describe mineral hardness.

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5. Cool Pics/Videos

Want to show off your latest pics? Well here's your chance; email the editor at My Cool Pics and we will try to post them in the next edition of "Clear Skies".

Check out our Photo gallery on the website where you can find pics from past and current Island Star Parties (ISP). Quick link is http://starfinders.ca/photogallery.htm

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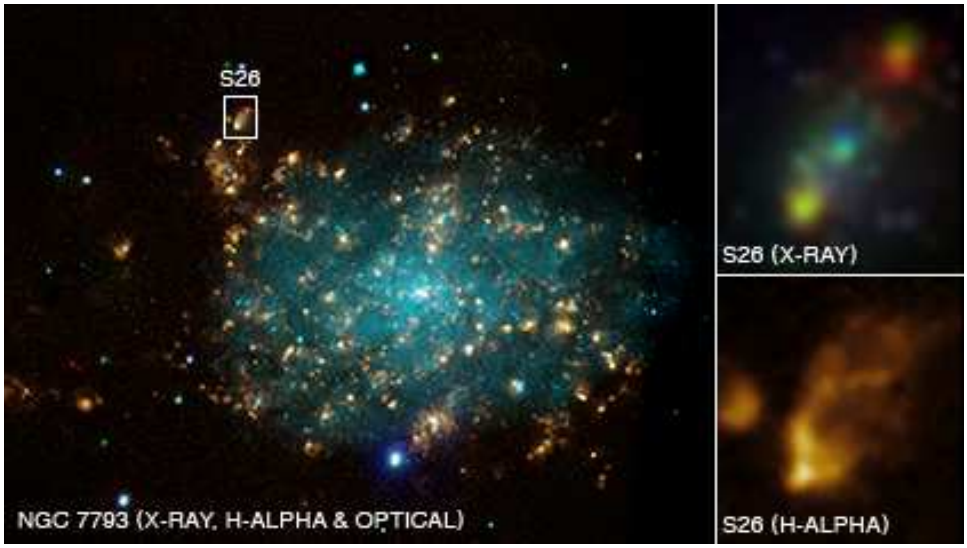
6. Featured Articles

Articles

RETURN TO CATEGORIES

1. Black Hole Blows Big Bubble
2. NASA Fnds Elusive Buckyballs
3. Clean Technology in "Hot Water"
4. Homing in on Higgs Boson
5. Instruments Selected for Mars
6. Taking the Twinkle Out of the Night Sky

Black Hole Blows Big Bubble– July 23/10 credit *JPL*



Combining observations made with ESO's Very Large Telescope and NASA's Chandra X-ray telescope, astronomers have uncovered the most powerful pair of jets ever seen from a stellar black hole. This object, also known as a microquasar, blows a huge bubble of hot gas, 1000 light-years across, twice as large and tens of times more powerful than other known microquasars. The discovery is reported this week in the journal Nature. "We have been astonished by how much energy is injected into the gas by the black hole," says lead author Manfred Pakull. "This black hole is just a few solar masses, but is a real miniature version of the most powerful quasars and radio galaxies, which contain black holes with masses of a few million times that of the Sun."

Black holes are known to release a prodigious amount of energy when they swallow matter. It was thought that most of the energy came out in the form of radiation, predominantly X-rays. However, the new findings show that some black holes can release at least as much energy, and perhaps much more, in the form of collimated

jets of fast moving particles. The fast jets slam into the surrounding interstellar gas, heating it and triggering an expansion. The inflating bubble contains a mixture of hot gas and ultra-fast particles at different temperatures. Observations in several energy bands (optical, radio, X-rays) help astronomers calculate the total rate at which the black hole is heating its surroundings.

The astronomers could observe the spots where the jets smash into the interstellar gas located around the black hole, and reveal that the bubble of hot gas is inflating at a speed of almost one million kilometres per hour. "The length of the jets in NGC 7793 is amazing, compared to the size of the black hole from which they are launched," says co-author Robert Soria [1]. "If the black hole were shrunk to the size of a soccer ball, each jet would extend from the Earth to beyond the orbit of Pluto."

This research will help astronomers understand the similarity between small black holes formed from exploded stars and the supermassive black holes at the centres of galaxies. Very powerful jets have been seen from supermassive black holes, but are thought to be less frequent in the smaller microquasar variety. The new discovery suggests that many of them may simply have gone unnoticed so far. The gas-blowing black hole is located 12 million light-years away, in the outskirts of the spiral galaxy NGC 7793 (eso0914b). From the size and expansion velocity of the bubble the astronomers have found that the jet activity must have been ongoing for at least 200 000 years.

Note:
[1] Astronomers do not have yet any means of measuring the size of the black hole itself. The smallest stellar black hole discovered so far has a radius of about 15 km. An average stellar black hole of about 10 solar masses has a radius of about 30 km, while a "big" stellar black hole may have a radius of up to 300 km. This is still much smaller than the jets, which extend out to 1000 light-years, or about 9000 million million km!

More Information:
This result appears in a paper published in this week's issue of the journal Nature (A 300 parsec long jet-inflated bubble around a powerful microquasar in the galaxy NGC 7793, by Manfred W. Pakull, Roberto Soria and Christian Motch).

ESO, the European Southern Observatory, is the foremost intergovernmental astronomy organisation in Europe and the world's most productive astronomical observatory. It is supported by 14 countries: Austria, Belgium, the Czech Republic, Denmark, France, Finland, Germany, Italy, the Netherlands, Portugal, Spain, Sweden, Switzerland and the United Kingdom. ESO carries out an ambitious programme focused on the design, construction and operation of powerful ground-based observing facilities enabling astronomers to make important scientific discoveries. ESO also plays a leading role in promoting and organising cooperation in astronomical research. ESO operates three unique world-class observing sites in Chile: La Silla, Paranal and Chajnantor. At Paranal, ESO operates the Very Large Telescope, the world's most advanced visible-light astronomical observatory and VISTA, the world's largest survey telescope. ESO is the European partner of a revolutionary astronomical telescope ALMA, the largest astronomical project in existence. ESO is currently planning a 42-metre European Extremely Large optical/near-infrared Telescope, the E-ELT, which will become "the world's biggest eye on the sky".

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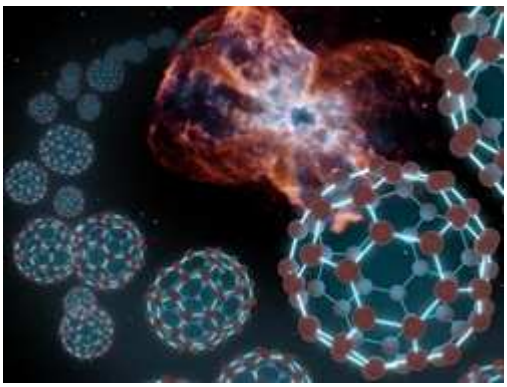
NASA Telescope Finds Elusive Buckyballs in Space for First Time– July 23/10

credit *JPL*

Astronomers using NASA's Spitzer Space Telescope have discovered carbon molecules, known as "buckyballs," in space for the first time. Buckyballs are soccer-ball-shaped molecules that were first observed in a laboratory 25 years ago.



They are named for their resemblance to architect Buckminster Fuller's geodesic domes, which have interlocking circles on the surface of a partial sphere. Buckyballs were thought to float around in space, but they had escaped detection until now.

NASA's Spitzer Space Telescope has at last found buckyballs in space, as illustrated by this artist's conception showing the carbon balls coming out from the type of object where they were discovered — a dying star and the material it sheds, known as a planetary nebula

"We found what are now the largest molecules known to exist in space," said Jan Cami from the University of Western Ontario, Canada, and the SETI Institute in Mountain View, California. "We are particularly excited because they have unique properties that make them important players for all sorts of physical and chemical processes going on in space."

Buckyballs are made of 60 carbon atoms arranged in three-dimensional spherical structures. Their alternating patterns of hexagons and pentagons match a typical black-and-white soccer ball. The research team also found the more elongated relative of buckyballs, known as C70, for the first time. These molecules consist of 70 carbon atoms and are shaped more like an oval rugby ball. Both types of molecules belong to a class known officially as buckminsterfullerenes, or fullerenes.

The Cami team unexpectedly found the carbon balls in a planetary nebula named Tc 1. Planetary nebulae are the remains of stars, like the Sun that shed their outer layers of gas and dust as they age. A compact, hot star, or white dwarf, at the center of the nebula illuminates and heats these clouds of material that has been shed. The buckyballs were found in these clouds, perhaps reflecting a short stage in the star's life, when it sloughs off a puff of material rich in carbon. The astronomers used Spitzer's spectroscopy instrument to analyze infrared light from the planetary nebula and see the spectral signatures of the buckyballs. These molecules are approximately room temperature — the ideal temperature to give off distinct patterns of infrared light that Spitzer can detect. According to Cami, Spitzer looked at the right place at the right time. A century from now, the buckyballs might be too cool to be detected.

The data from Spitzer were compared with data from laboratory measurements of the same molecules and showed a perfect match. "We did not plan for this discovery," Cami said. "But when we saw these whopping spectral signatures, we knew immediately that we were looking at one of the most sought-after molecules."

In 1970, Japanese professor Eiji Osawa predicted the existence of buckyballs, but they were not observed until 1985. Researchers simulated conditions in the atmospheres of aging, carbon-rich giant stars in which chains of carbon had been detected. Surprisingly, these experiments resulted in the formation of large quantities of buckminsterfullerenes. The molecules have since been found on Earth in candle soot, layers of rock, and meteorites.

The study of fullerenes and their relatives has grown into a busy field of research because of the molecules' unique strength and exceptional chemical and physical properties. Among the potential applications are armor, drug delivery, and superconducting technologies.

"This most exciting breakthrough provides convincing evidence that the buckyball has, as I long suspected, existed since time immemorial in the dark recesses of our galaxy," said Harry Kroto, who shared the 1996 Nobel Prize in chemistry with Bob Curl and Rick Smalley for the discovery of buckyballs.

Previous searches for buckyballs in space, in particular around carbon-rich stars, proved unsuccessful. A promising case for their presence in the tenuous clouds between the stars was presented 15 years ago using observations at optical wavelengths. That finding is awaiting confirmation from laboratory data. More recently, another Spitzer team reported evidence for buckyballs in a different type of object, but the spectral signatures they observed were partly contaminated by other chemical substances.

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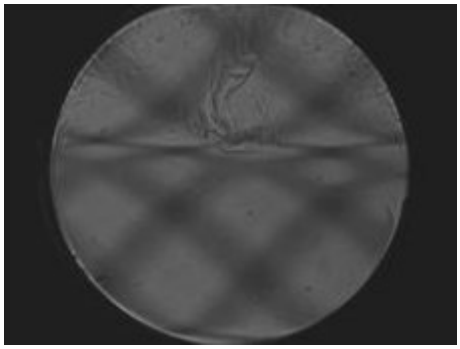
Clean Technology in 'Hot Water'– July 23/10 credit Marshalll Space Flight Centre

What if work performed in space could improve the treatment of household and nuclear waste on Earth? That's what investigators are hoping to do with the results of a fluid physics study in progress on the International Space Station. The experiment, called DECLIC-HTI, is studying supercritical water that could lead to spin-offs in the field of clean technologies for treating waste here on Earth.

Right: The optical fluid cell for the study of water properties inside DECLIC. A supercritical fluid is any substance at a temperature and pressure above its critical point -- the point at

which the fluid is one homogeneous phase and exhibits properties of both liquids and gases. In this form, the substance can flow through solids like a gas and dissolve materials like a liquid. Water and carbon dioxide are the most commonly used supercritical fluids. Using extremely high temperatures, supercritical water can completely break down waste into benign forms.



Right: Pure water above the critical point observed in wide field transmission during ground tests of DECLIC

DECLIC, or DEvice for the study of Critical LIquids and Crystallization, is a miniaturized, automatic thermo-optical laboratory that studies transparent fluids by finely tuning the temperature of a sample and sending images and video to the ground. The HTI, or high temperature insert, can measure fluid temperatures up to 400 degrees Celsius.

For the experiment, astronauts plug an insert, containing the water sample cell, into the DECLIC payload. The sample is precisely heated and observed in real time by investigators on the ground. "These phenomena will be of interest to understand the behavior of supercritical fluids in space, but also to improve industrial processes on the ground," said Gabriel Pont, DECLIC mission manager with the CNES, or Centre National d'Etudes Spatiales, in Toulouse, France.

"A typical example is burning completely organic or industrial waste in supercritical water at a much lower temperature than in conventional systems, thus saving energy and being cleaner. Microgravity will provide the ideal environment to understand how to do that." The supercritical water temperature is very sensitive to gravity and has never been measured in microgravity conditions. "We expect HTI to give us the best measurement of this temperature ever found," added Pont. The experiment began in October 2009 when the High Temperature Insert commissioning was performed. Since then, four experimental sequences have been performed, leading to more than 80 running days. "We are very excited about what we've seen thus far, and cannot wait to see the potential benefits of our work on Earth," added Pont.

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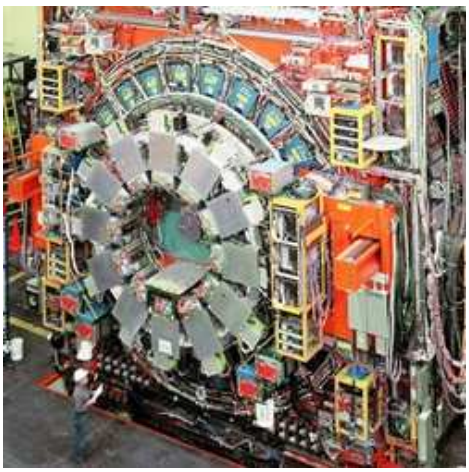
Massive Results for Scientists Homing in on Higgs Boson– July 27/10 credit *Science and Technology Facilities, UK*



An international team of researchers, including several members from the United Kingdom and the U.S. Department of Energy's Fermilab, has announced results that indicate that the quest to discover the elusive Higgs boson particle has taken a giant leap forward, drawing closer to answering questions about the makeup of the universe.

These latest results, which were scientists obtained at Fermilab's DZero and CDF projects, significantly narrow down the possible mass range of the Higgs boson particle, ruling out a quarter of the mass range that had previously been thought possible. To obtain the latest Higgs search result, CDF and Dzero's analysts separately sifted through more than 500,000 billion proton-antiproton collisions that each experiment has studied since 2001. After the two groups obtained their independent Higgs search results, they combined the data to produce the joint exclusion limits of the Higgs particle's mass.

"Our latest result is based on about twice as much data as a year and a half ago," said Stefan Soeldner-Rembold from the University of Manchester, England. "As we continue to collect and analyze data, the experiments will either exclude the standard model Higgs boson in the entire allowed mass range or we'll go on to see first hints of its existence. There is less and less room for the Higgs boson to hide now."

"There are important pieces missing in our understanding of the basic building blocks of the universe,

and these results are an important step in learning how our universe works and why it exists," said John Womersley from the Science and Technology Facility Council (STFC) in the United Kingdom.

In addition to the announcement of these results, this year's International Conference on High Enery Physics (ICHEP) in Paris is the first conference where physics results obtained at the Large Hadron Collider (LHC) have been presented. Rolf Heuer from the European Organization for Nuclear Research (CERN) presented measurements from the first 3 months of successful LHC operation, at an energy 3.5 times higher than has previously been achieved at a particle accelerator.

The Higgs boson particle was originally proposed by Peter Higgs, a British theoretical physicist, as a solution to one of the most basic puzzles in particle physics — why some particles possess mass and others do not. Since then, scientists could only speculate about the existence of the Higgs particle, but thanks to current research and experiments being carried out at the LHC at CERN in Switzerland and the Tevatron Collider at Fermilab in the U.S., a glimpse of the Higgs boson particle could soon be a closer reality

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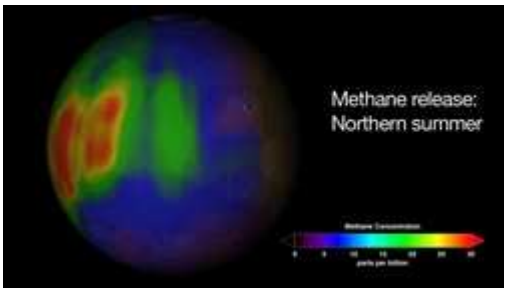
Instruments selected for Mars–Aug 4/10 *credit ESA News*



The European Space Agency (ESA) and NASA have selected the scientific instruments for their first joint Mars mission. Scheduled for 2016, it will study the chemical makeup of the martian atmosphere, including methane. Discovered in 2003, methane could point to life on the Red Planet.

NASA and ESA have embarked on a joint program of martian exploration, an unprecedented new alliance for future ventures to Mars. The ExoMars Trace Gas Orbiter is the first in a planned series of joint missions leading to the return of a sample from the surface of Mars. Scientists worldwide were invited to propose the spacecraft's instruments.

The ExoMars Trace Gas Orbiter will map the variation of martian methane with unprecedented accuracy, helping to determine whether the methane is biologically or volcanically produced.

"To fully explore Mars, we want to marshal all the talents we can on Earth," said David Southwood, ESA director for Science and Robotic Exploration. "Now NASA and ESA are combining forces for the joint ExoMars Trace Gas Orbiter mission. Among its objectives is to characterize the planet's atmosphere and, in particular, search for trace gases like methane."

"We got our first sniff of the gas with Mars Express in 2003; NASA has since clearly confirmed this," Southwood said. "Mapping methane allows us to investigate further that most important of questions: Is Mars a living planet, and if not, can or will it become so in the future?"

ESA and NASA have now selected five science instruments from the 19 proposals submitted in January 2010 in response to an Announcement of Opportunity for the first mission. They were judged to have the best scientific value and lowest risk, and they will be developed by international teams of scientists and engineers on both sides of the Atlantic.

"Independently, NASA and ESA have made amazing discoveries up to this point," said Ed Weiler, from NASA's Science Mission Directorate in Washington. "Working together, we'll reduce duplication of effort, expand our capabilities, and see results neither ever could have achieved alone."

The orbiter will carry a European entry, descent and landing demonstrator vehicle. ESA [View Larger Image]In addition to the Trace Gas Orbiter, the 2016 mission will carry Europe's entry, descent, and landing demonstration vehicle. The whole mission will be launched on a NASA rocket.

The next ExoMars mission, scheduled for 2018, will consist of a European rover with a drill, an American rover capable of caching selected samples for potential future return to Earth, and a NASA landing system using a NASA launcher. These activities are designed to serve as the foundation of a cooperative program to increase science return and move the two agencies toward a joint Mars sample-return mission in the 2020s.

The selected science instruments are:

Mars Atmospheric Trace Molecule Occultation Spectrometer (MATMOS) — an infrared spectrometer to detect low concentrations of molecular constituents of the atmosphere. Principal investigator is Paul Wennberg from the California Institute of Technology, Pasadena. Participating countries are the United States and Canada.

High-resolution solar occultation and nadir spectrometer (SOIR/NOMAD) — an infrared spectrometer to detect trace constituents in the atmosphere and to map their location on the surface. Principal investigator is Ann Vandaele from the Belgian Institute for Space Aeronomy in Brussels, Belgium. Participating countries are Belgium, Italy, Spain, the United Kingdom, the United States, and Canada.

ExoMars Climate Sounder (EMCS) — an infrared radiometer to provide daily global measurements of dust, water vapor, and chemical species in the atmosphere to aid the analysis of the spectrometer data. Principal investigator is John Schofield from the Jet Propulsion Laboratory in Pasadena, California. Participating countries are the United States, the United Kingdom, and France.

High-resolution Stereo Color Imager (HiSCI) — a camera to provide four-color stereo imaging at 2-meter resolution per pixel over an 8.5-kilometer swathe. Principal investigator is Alfred McEwen from the University of Arizona in Tucson. Participating countries are the United States, Switzerland, the United Kingdom, Italy, Germany, and France.

Mars Atmospheric Global Imaging Experiment (MAGIE) — a wide-angle multispectral camera to provide global images in support of the other instruments. Principal investigator is Bruce Cantor from the Malin Space Science Systems in San Diego, California. Participating countries are the United States, Belgium, France, and the Russian Federation.

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Taking the Twinkle out of the Night Sky: Breakthrough in Adaptive Optics–

Aug 5/10 credit *ScienceDaily*

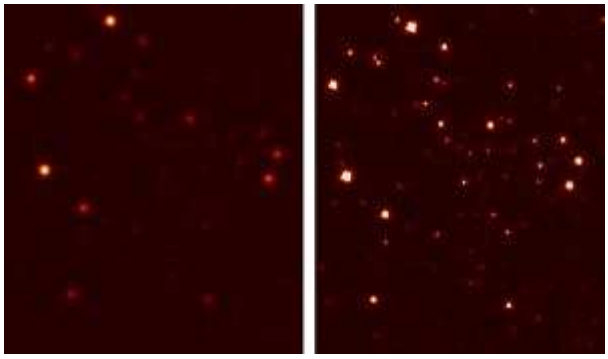
Sometimes a problem is so big, one country cannot handle it alone.

If you are like most people, you probably enjoy the twinkling of stars that blanket the sky on a clear summer night. If you are an astronomer, chances are you find it extremely annoying.

A team of University of Arizona astronomers led by Michael Hart has developed a technique that allows them to switch off the twinkling over a wide field of view, enabling Earth-based telescopes to obtain images as crisp as those taken with the Hubble Space Telescope, and much more quickly.

They describe the technique, called laser adaptive optics, in the Aug. 5 issue of Nature.

Atmospheric turbulence blurs the light from celestial objects by the time it reaches the mirror of a ground-based telescope. Most of the distortion happens less than a half mile above ground, where heat rising from the surface ruffles the air. Think of laser adaptive optics as noise-canceling headphones, only for light waves instead of sound waves. A bundle of laser beams and a pliable mirror in the telescope optics form the heart of the system.



Right: While this region of Galactic Globular Cluster M3 appears to harbor only a few fuzzy stars when viewed through conventional ground-based telescope optics (left), laser adaptive optics brings out the fainter stars and makes the image sharper (right). (Credit: Photo by M. Hart)

From their observatory on Mount Hopkins south of Tucson, Ariz., Hart and his group point a bundle of green laser beams into the night sky. Some of the laser light bounces off oxygen and nitrogen molecules high up in the atmosphere, creating five artificial stars spread across the field of view.

"We observe what the turbulence in the atmosphere does to them," explains Hart, a professor of

astronomy in UA's Steward Observatory and department of astronomy. "The light that is reflected back tells us what we need to know about the turbulence." The turbulence data are then fed into a computer that controls the adaptive mirror, whose back side is studded with so-called actuators, small magnetic pins surrounded by coils.

When the computer sends electric currents through the coils, the actuators move, not unlike a loudspeaker translates electric signals from an amplifier into movements of the sound membranes. Hart's adaptive mirror has 336 actuators glued to its back side that cause the mirror to warp just enough to cancel out the flickering caused by the atmosphere. The corrective movements are too tiny for the human eye to see and happen a thousand times each second. The difference between a telescope with adaptive optics and one without is similar to a camera with a built-in image stabilizer compared to one without.

According to Hart, astronomers and engineers have advanced adaptive optics considerably over the past 15 to 20 years, but until now, the technology was fraught with a fundamental limitation: Atmospheric blurring could only be removed along a very narrow line of sight. "It's like being able to see sharp through a pin hole, while the rest of your field of view looks like frosted glass," said Hart. "Our technique makes the pin hole much bigger."

The laws of physics impose a trade-off between field of view and resolution. Hart's group sacrifices some of the very high resolution to gain a larger field of view, but for many science endeavors this trade-off is well worth taking, he said.

One such endeavor is the study of very old galaxies that formed around 10 billion years ago when the universe was less than a quarter of its current age. Known to astronomers as high red-shift galaxies, these objects are billions of light years away. "To understand the evolution of those ancient galaxies, we have to observe thousands of them and study their spectral characteristics and chemical composition," Hart said, "and taking a spectrum of a high red-shift galaxy takes a long time because they are so faint." "With our new adaptive optics technique, you can now observe dozens at a time. Sampling thousands of galaxies' spectra becomes feasible."

Supermassive star clusters are another example.
"In those clusters, stars are being born as we speak and that's where we have to point our telescopes to learn about the processes that drive star formation." "There is still a lot that remains mysterious," Hart added, "mostly because these clusters extend over several fields of view and are jam-packed with stars that seem to run into each other unless you can get a super-sharp image." But before astronomers can even begin to analyze light spectra of the stars in the cluster, they have to disentangle them first. "You need to know which stars are actually part of the cluster and which ones only happen to be in your line of sight," Hart explains. "To do that, you compare images taken a year or so apart. If you find stars that have moved in the meantime, it means they are not gravitationally bound to the cluster. It is much easier to pinpoint the position of a star if you have an image that is sharp rather than fuzzy."

With the new adaptive optics system, entire star clusters may be examined in a single pointing, the authors write in their article. Hart's group expects their technique to be applied on very large telescopes such as the Giant Magellan Telescope, which is being developed by astronomers at the University of Arizona and elsewhere."We haven't yet tapped out the limit of our adaptive optics system," Hart said. "We can now cancel the atmospheric turbulence over a field of two arc minutes, which is about the diameter of one-fifteenth of a full moon." At the cosmic distances of deep space, that's a lot of star clusters and a lot of high red-shift galaxies.

Hart's co-authors on the paper are: Mark Milton, Christoph Baranec (now at Caltech Optical Observatories, Pasadena, Calif.), Keith Powell, Thomas Stalcup (Keck Observatory, Hawaii), Don McCarthy, Craig Kulesa and Eduardo Bendek. The National Science Foundation funded the work.

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7. Buy and Sell

Here's your chance to clean out the closet and find a home for your slightly used treasures. Post your buy and sell items by emailing the Editor with your details.

For Sale : Telescope and mount package "offers on $1800 Cdn "
Please contact Gail Roberson 250-715-1116

DETAILS:

Telescope Optical Tube

-Celestron 8□ Schmidt Cassigrain Telescope with XLT coating model year 2002?)
- Tube rings and vixen style dovetail bar to fit scope
- Celestron 25mm Modified Achromat eyepiece
- Celestron 10mm Modified Achromat eyepiece Antares 8x50mm - Finder scope with illuminated reticule and quick release bracket
- Celestron Radial Guider (off axis), model 94176
- Celestron f/6.3 Reducer/Corrector (focal reducer)
- 12.5mm Illuminated Reticule eyepiece (Skywatcher ?)

* Some scratches on scope, but overall in good condition.

EQ6 Mount

- Sky Watch EQ-6 Heavy Duty Mount, (black) with EQ-6 SynScan GOTO Upgrade kit
- Steel tripod with 2" legs.
- Two counterweights
- Home made wheel cart (mount sits on top, not attached)
- All cables, chargers and adapters

* Some paint chips,ran well as of last use. Used for astrophotography

Software and Manuals

- The Sky Level 1, v.5, NextStar Observer List, v.2.0.2c, Imaginovia
- Starry Night Skytheater (DVD), Starry Night v. 6 Users Guide, Starry Night v.6 Companion

Additional

- USB to Serial adapter (Hap Griffin) for Nikon
  T-adapter for Nikon
- The Backyard Astronomer, Dickinson and Dyer
- A Guide to the Night Sky, Burnham, Dyer et tel
- Voyages to the Stars and Galaxies, Fraknoi, Morrison, Wolff

We also want to bring your attention to a FREE Telescope! You read it right; Alex Haddad at the Science Department at the Cowichan Secondary has this to offer.
"*please pass around to any and all who may be interested inthis behemoth. Our offer still stands:* ***FREE TO A GOOD HOME***" If you are interested in owning this scope, contact Alex at ahaddad@sd79.bc.ca

DEAL PENDING
George Ball Observatory is looking for a new home
The RASC Society is offering this astronomical observatory at NO COST to a good home.

The building will require a proper concrete foundation and slab. Due to it's size and weight a commercial crane and trailer assembly will be required to lift and deliver it to a new site at the new owners expense. Crane costs and construction work are estimated to be in the $2,500 to $3,000 range. Serious inquiries are welcomed. For an appointment to view please contact : Bruno Quenneville at (250) 477-2257

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8. Ask an Expert

Have you been thumbing through the Astronomy or Sky and Telescope magazine and have some questions on the latest and greatest in astronomy gear? Or maybe you're narrowing down your search for just the right telescope and want to know the difference between Dobsonians, Schmidt-Cassegrains, Reflector and Refractors. Well wonder no more, email Brian Robilliard our resident expert to get the "inside scoop" on what's hot or not in astronomy gear.

Are you seeing double or unable to focus? Chances are you need to collimate your scope. Are you looking for a good eyepiece? Why do you need to know the focal length of your telescope's mirror and how do you determine the focal length? For answers to these and other telescope questions

email Ed Maxfield our expert on telescope tips, hints and suggestions.

Are you new to astronomy? Want to know the how to find objects in the sky? Or just wondering what that bright object in the evening sky is? Well wonder no more; email Bryon Thompson our Public Outreach Officer and master of Astronomy 101 basics.

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9. Kids Korner

For the younger astronomers. We want your input on what you would like to see happening at the club. Tell us a bit about yourself and why you love astronomy. Email the Editor with your submissions. For the older folks, if you have any ideas that might spark the interest of a young upcoming astronomer, please send your submissions to the editor.

Head out to the RASC Starparty on Aug 13-15 for some fun-filled activities.

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10. The Sky This Month

By Bryon Thompson

Observing Site: Duncan, 48.783°N, 123.700°W

If your thing is looking for planets then this month holds some treasures for you. August has seven planets in store not counting the one your telescope is mounted on. Our favourite meteor shower is going to be great as well.

If you look west at sunset about half a fist's width above the setting sun you may see little Mercury. Our innermost planet reaches greatest elongation around **August 6th** when it is 27° east of the sun. This month however the ecliptic, the path the sun and the planets follow across the sky, lies at a low angle and the result is that Mercury will only reach a mere 6° above the horizon. Mercury shines at magnitude 0.1 early in the month but quickly fades to 0.3 by the 6th. By the middle of the month it has faded from view.

The seeming landing light of that stationary jet aircraft that is persistently headed your way is actually the planet from Hell. Scorching hot Venus is by far the brightest star like object in the evening sky blasting its reflected light our way at magnitude -4.1. It lies about one and a half fist's widths above the western horizon a half hour after sunset. If you hadn't guessed yet the width of your fist held at arms length is about 10° of arc. Your little finger is approx. 1° and the first three fingers on either hand cover 5°. Venus will brighten to magnitude -4.5 by **August 19th** when it reaches greatest elongation. Check how much brighter it gets by **August 31st** when it reaches its brilliant magnitude of -4.6.

Venus is joined by Saturn and Mars in the same area of the sky. Mars is the magnitude 1.5 ruddy orange dot 7° to Venus' upper right and Saturn is the 1.1 magnitude yellowish dot 2° past Mars. The relative positions of these planets changes as the month progresses and their orbital motions bring them closer together; within a 7° circle. On the night of the famous Perseids, **August 12th** a slim crescent moon joins the trio.

Our most distant planet, not counting dwarf planets, can be found 20° high in the southeast. Neptune reaches opposition this month on **August 20th** and can be seen at magnitude 7.8 in the eastern edge of Capricornus. A Neptune year equals 164.8 earth years. 2010 - 164 = 1846. Neptune is almost in the same position it was when it was discovered by Johanne Galle on September 23rd 1846, only one Neptune year ago. Cool huh! To see this blue grey gas giant, look 2° from Mu Capricornus towards 38 Aquarii. Neptune moves to within 1° of Mu Cap. by month's end.

Jupiter takes over from Venus as the brightest point of light after the inner planet beacon sets. By 10pm local time Jupiter can be seen creeping over the eastern horizon in Pisces shining at magnitude -2.8. It rises a little earlier every evening. By the end of the month it starts its traverse across the sky by about 8pm local time. Jupiter provides telescope owners with some great views. It is amazing to think that the planet you are looking at could hold all the other planets in our solar system and still have lots of room left over, yet this massive giant spins so fast that a Jovian day is only 10 hours long. Look for dark bands, areas of warmer lower level cloud layers as opposed to the lighter regions of hotter higher level clouds. Jupiter's four large moons offer some good occultations

and transits this month as well. There are far too many of these events to list all 60 of them but a few notable ones are as follows. On August 11/12th Europa will pass into Jupiter's shadow and reappear a little under 5 hours later. The moon disappears at 9:37pm PDT on the 11th and reappears at 2:17am PDT on the 12th. A shadow transit is when one of the moons pass in front of the big planet and cast their shadow on its face. One such event happens on the 14/15 of August when Io places its shadow on Jupiter at 9:40pm PDT and creeps across the Jovian face for 2 hours and 14 minutes. The moon trails its shadow by 54 minutes. Wait until after 10:45 to try to spot the moon itself against the backdrop of the planet, a task much harder to do than spotting the dark dot of its shadow on the sea of light.

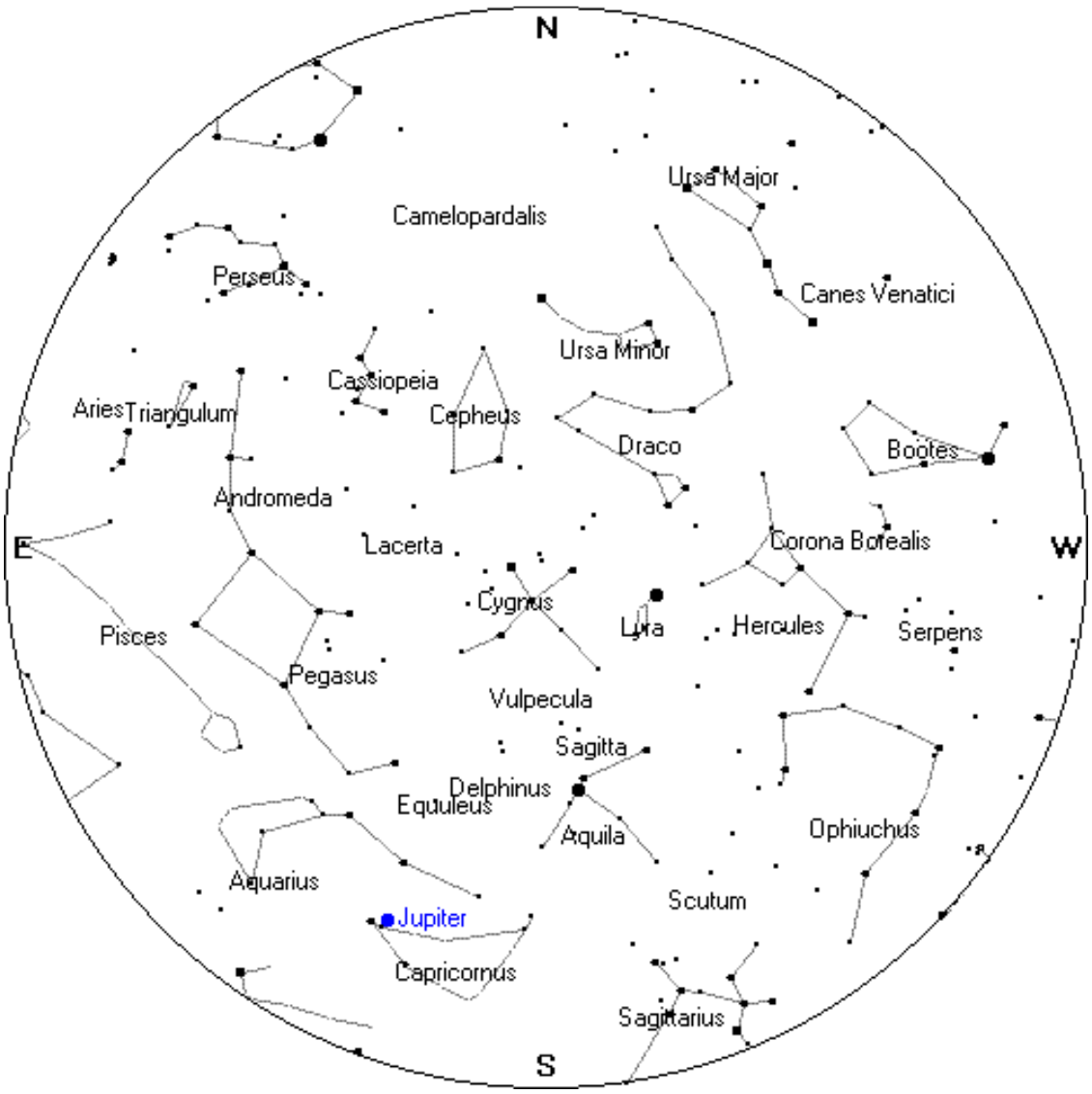
If you know where to look, a good naked eye object is Uranus. It is best to use binoculars to see the magnitude 5.8 blue green dot just 3° west of Jupiter. The angular distance between these two shrinks to 1.8° by the end of the month. You should be able to see a small disc of only 3.7" of arc with a telescope after you find it with your binoculars.

When the moon cooperates, **August is Perseid month**. This year the moon is in a good mood! The moon will set and provide us with a dark sky but the peak of the shower is not cooperating for those of us on the west coast. The peak of the shower happens at 5pm PDT and is therefore best for viewers in Europe. We should still get upwards of 30 meteors per hour however and after all it is summer! The best time to view is after midnight when the radiant is highest in the sky. On the night of the **12th of August** find yourself a piece of dark away from city lights, set up your gravity chair or blanket, get your binoculars focused on the stars overhead and get ready for some fun. I like to try to see the smoke trails left behind these streaking bits of dust. When you see a meteor, keep your eyes trained on that piece of sky and bring the bino's to your eyes. If you are fast enough, you may see the ionized trail that this piece of dust from comet Temple Tuttle makes as it heats up due to friction with the upper atmosphere.

Whether or not you see smoke trails or distant planets, get out and enjoy the warm nights and great viewing opportunities this month has to offer. I hope to see all of you at this year's Summer Star Party early in September, till then, remember, Astronomy is looking up.

Aug 2	09:59 PM PDT	Last Quarter Moon
Aug 6	0600 PM PDT	Mercury at greatest elongation 27°
Aug 9	7:00PM PDT	Venus pass 3° South of Saturn
Aug 9	8:08 PM PDT	New Moon
Aug 12	05:00 PM PDT	Perseid Meteor Shower Peaks
Aug 16	11:14 AM PDT	First Quarter Moon
Aug 19	09:00 PM PDT	Venus at greatest Eastern elongation 46°
Aug 20	03:00 AM PDT	Neptune at opposition
Aug 23	03:00 PM PDT	Venus 2° South of Mars
Aug 24	10:05 AM PDT	Full Moon

Sky Chart —Here's your mid-Aug midnight sky chart. In order to use the sky chart properly remember the centre of the chart is the sky directly above your head (or the Zenith). Turn the chart so that the direction you are facing is at the bottom of the chart (or pointed toward your toes). The star field directly in front of you will be between the bottom of the chart and the centre.



SkyChart Courtesy of Heavens-Above

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