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## 1. Greetings!

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

This newsletter is dedicated to the memory of Sandy Clark November 1, 1941 March 6, 2010. Here is a excerpt taken from the Times Colonist.

Sandy was a self-taught artist, muralist, sculptor, teacher, boat-builder, sailor and astronomer; her creativity, outrageous humour and determination inspired and endeared her to all those who knew her. Well-known for her murals in Chemainus, BC, Sandy's paintings in oils, watercolours and acrylics captured the mood of her subjects in a magical way, whether they be seascapes, landscapes, portraits or imaginative renderings of the cosmos. Sandy loved sailing the island waters. She designed and built her own sailboat, and later undertook the building of a sleek powerboat, which she named after her grandmother, Eugenie. Faced with the relentless progression of Parkinson's disease, Sandy's courage and spunk could not be defeated. In her 50's, Sandy unleashed her intelligence, curiosity and remaining energy into the study of astronomy. Her handmade telescopes earned awards from local star-gazing clubs. Below is a picture of Sandy winning the 2002 CVSF Merit Award for Excellence in Telescope construction.



Her telescope was an innovative idea which brought the stars to folks confined to a wheelchair. The wheelchair foundation was based on a lazy susan idea where the chair moved and the telescope was stationary. She perfected the telescope's counter balance by first filling a bag of pennies until the exact weight was obtained. Knowing the correct weight; she proceeded to get the counterweights

made which balance the telescope. Below are pictures of Sandy's telescope.



Sandy passed away peacefully at the Chemainus Health Care Centre with family and friends by her side. Sandy, you have touched us with your incredible Spirit. Journey well, dear one, until we meet again.

Many thanks to this month's contributors Moe R and Bryon T.

By Freda Eckstein

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

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## Quick Links

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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 or follow these directions.

Island Hwy, Mill Bay

Turn on Frayne Rd towards ocean (Serious Coffee is on the corner)

Turn right on Huckleberry Rd

3rd house on the left across from Springbank road and Mail boxes.

Look for the STAR sign

Please park on Huckleberry or Springbank Rd's.

Call Brian 743-6633 if you need directions

Our next Social will be held at **7:30** on **WEDNESDAY April 28th**

**Feature: "Living and Working on the International Space Station"** a film by Dr. Robert Gifford. Dr. Gifford is a Professor in the Department of Psychology at UVIC. His research interests are at the interface of environmental psychology, social psychology, and personality psychology. He is a member of the Life Sciences Advisory Committee of the Canadian Space Agency as well as being active on various other boards and listserves. He has taught environmental psychology for over 30 years and has put his experience to words with his book *Environmental Psychology: Principles and Practice (4th ed.)* published by Optimal Books. Dr. Gifford gives us an opportunity to get into the psyche of what it may be like to live and work on the ISS.

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## Highlights – Mar 24/10

By Freda Eckstein

Our feature was a film on "Europa: Mystery of the Ice Moon" courtesy of Moe. We thought this was a good choice since scientists for the first time found a shrimp-like creature and a jellyfish frolicking beneath a massive Antarctic ice sheet, six hundred feet below the ice where no light shines. See a picture of the "shrimp-like creature" plus the full news story in this month "Featured Articles". Discovering this incredible creature leads scientists to wonder what about other hostile places? What

about Europa, a frozen moon of Jupiter? We also had two new members join the club. Colleen Kennelly joined online and Miles Waite came to the social. Welcome to you both and please don't be strangers, we hope to see you on April 24<sup>th</sup> our International Astronomy day event.

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## 3. Upcoming Events



**April 2-8 Hubble, Change How You View Our Universe!** National Geographic IMAX Theatre, Victoria 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>

**April 17 7:00pm - 40 Years Later What went right?** H.R MacMillan Space Centre, Vancouver The H.R. MacMillan Space Centre celebrates the 40th Anniversary of Apollo 13 with a movie screening and lecture. Astrophysicist Jaymie Matthews discusses "what went right" with the near fatal mission. For more information click on the link [http://www.hrmacmillanspacecentre.com/apollo13\\_movie\\_lecture.htm](http://www.hrmacmillanspacecentre.com/apollo13_movie_lecture.htm)

### **April 24 Astronomy Day (Astronomy Week: April 19-25)**

The club will be doing a small public star party on Astronomy day. We are still working through the details and will post more information as plans develop.

### **NASA Launches** credit NASA.Com:

**Date:** April 5 +

**Mission:** STS-131

**Launch Vehicle:** Space Shuttle Discovery

**Launch Site:** Kennedy Space Center - Launch Pad 39A

**Launch Time:** 6:21 a.m. EDT

**Description:** Space shuttle Discovery will carry a Multi-Purpose Logistics Module filled with science racks that will be transferred to laboratories of the International Space Station.

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## 4. This Month In History

*Courtesy of: Windows to the Universe*

### **April 1, 1940 - Wangari Maathai's birthday**

Wangari Maathai was born in Nyeri, Kenya (Africa) in 1940. She founded the Green Belt Movement in 1977. The movement paid Kenyan women to plant trees. This provided jobs for Kenyan women and helped to stop deforestation. Wangari Maathai has helped African countries make their own programs to plant trees.

### **April 12, 1961 - Yuri Gagarin becomes the first man in space**

Gagarin became the first person in space when he flew aboard the Vostok spacecraft in 1961. He orbited the Earth once on this historic flight. The flight lasted 1 hour and 48 minutes.

### **April 14, 1629 - Christian Huygens's birthday**

Christian Huygens was a Dutch physicist and astronomer who lived between 1629-1695. Using a telescope he had made, Huygens first identified Saturn's rings and one of Saturn's moons. Huygens also invented the pendulum clock and proposed the wave theory of light.

### **April 15, 1452 - Birthday of Leonardo da Vinci**

Leonardo da Vinci was an Italian artist and scientist who lived between 1452-1519. Leonardo was the original Renaissance man, whose roles included inventor, engineer, architect, mathematician, geologist, and astronomer.

### **April 17, 1790 - Death of Ben Franklin**

Ben Franklin was an American scientist and statesman who lived between 1706-1790. Franklin's famous kite experiment led to his invention of the lightning rod. His other inventions included bifocals and a stove which heats houses more safely than a fireplace.

### **April 18, 1955 - Death of Albert Einstein**

Albert Einstein was a German physicist who lived between 1879-1955. Probably the most well-known scientist of the twentieth century, Einstein came up with many original theories and invented modern physics. He is most famous for his theory of relativity,



**April 19, 1882 - Death of Charles Darwin**

Charles Darwin was an English Naturalist who lived between 1809-1882. He laid the foundations for the modern science of biology, and changed how other scientists understood the appearance of life on Earth. In 1859 Darwin published a book called *The Origin of Species by Means of Natural Selection*, which started a scientific revolution.

**April 23, 1858 - Birthday of Max Planck**

Max Planck was a German physicist who lived between 1858-1947. His theories changed our understanding of atomic processes and started the field of quantum physics, which studies energy inside atoms. Many of Planck's ideas were later used by Einstein when he developed his theory of relativity.

**April 24, 1990 - Hubble Space telescope put into orbit**

The Hubble was first launched in 1990 from Space Shuttle Discovery, but the design and construction started in the 1970's. The project is a joint one between the National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA).

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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".

**Barnstorming Mars in 3D**

British 3D animation guru Doug Ellison has created the most dramatic example to date. The virtual camera flies 300 feet above the martian terrain in the southwest corner of Candor Chasima. He has set up a YouTube channel called [MARS3DdotCOM](#) with other visualizations. (The HiRISE team is now releasing digital terrain models that they produce in-house, so that anybody with 3D rendering software and some skill can try creating this sort of animation.)

**Earth In High-Definition and Living Color**

NASA's Goddard Space Flight Center has posted pictures of what it describes as the best-ever photos of Earth, on a project called "Blue Marble Next Generation." The globe is assembled from a mosaic of satellite data taken mostly from a sensor called the Moderate Resolution Imaging Spectroradiometer (MODIS) that flies aboard NASA's Terra and Aqua satellites. Details as small as 1600 feet across can be seen. The Next Generation version offers a year's worth of monthly composite images that reveal seasonal rhythm of mother Earth: the spring greening and fall browning of vegetation in temperate regions, dry and wet seasons in the tropics, and the advancing and retreating Northern Hemisphere snow cover. [http://www.youtube.com/watch?v=Ed2v-fAf45k&feature=player\\_embedded](http://www.youtube.com/watch?v=Ed2v-fAf45k&feature=player_embedded)

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

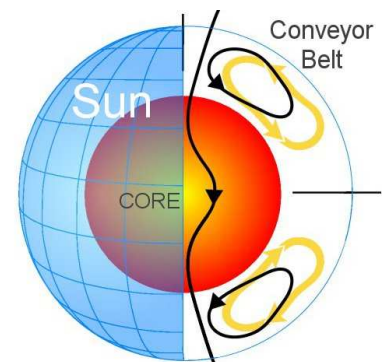
[RETURN TO CATEGORIES](#)

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### Solar 'Current of Fire' Speeds Up— March 12/10 credit Science@NASA

Solar physicist David Hathaway reports that the top of the sun's Great Conveyor Belt has been running at record-high speeds for the past five years. "I believe this could explain the unusually deep solar minimum we've been experiencing," says Hathaway. "The high speed of the conveyor belt challenges existing models of the solar cycle and it has forced us back to the drawing board for new ideas."

The Great Conveyor Belt is a massive circulating current of fire (hot plasma) within the sun. It has two branches, north and south, each taking about 40 years to complete one circuit. Researchers believe the turning of the belt controls the sunspot cycle.



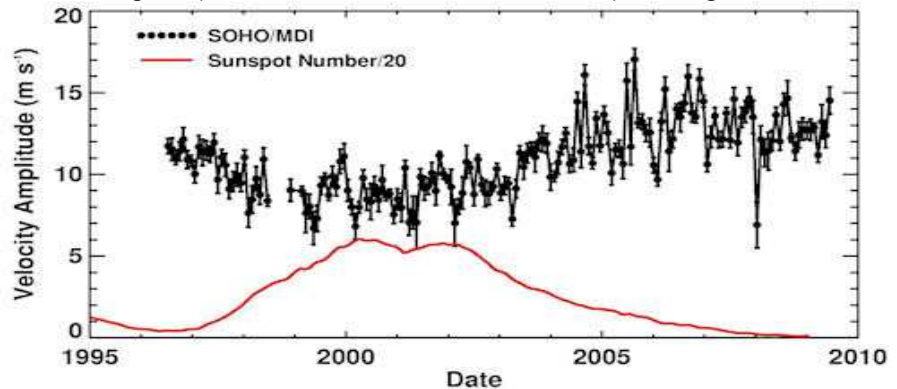
Above: An artist's concept of the sun's Great Conveyor Belt

Hathaway has been monitoring the conveyor belt using data from the Solar and Heliospheric Observatory (SOHO). The top of the belt skims the surface of the sun, sweeping up knots of solar magnetism and carrying them toward the poles. SOHO is able to track those knots—Hathaway calls them "magnetic elements"—and thus reveal the speed of the underlying flow. "It's a little like measuring the speed of a river on Earth by clocking the leaves and twigs floating downstream," Hathaway explains.

SOHO's dataset extends all the way back to 1996 and spans a complete solar cycle. Last year, Lisa Rightmire, a student of Hathaway from the University of Memphis, spent the entire summer measuring magnetic elements. When she plotted their speeds vs. time, she noticed how fast the conveyor belt has been going.

A note about "fast": The Great Conveyor Belt is one of the biggest things in the whole solar system and by human standards it moves with massive slowness. "Fast" in this context means 10 to 15 meters per second (20 to 30 miles per hour). A good bicyclist could easily keep up.

Below: The velocity of the Great Conveyor Belt (a.k.a. "meridional flow") since 1996. Note the higher speeds after ~2004. credit: Hathaway and Rightmire, 2010.



The speed-up was surprising on two levels.

First, it coincided with the deepest solar minimum in nearly 100 years, contradicting models that say a fast-moving belt should boost sunspot production. The basic idea is that the belt sweeps up magnetic fields from the sun's surface and drags them down to the sun's inner dynamo. There the fields are amplified to form the underpinnings of new sunspots. A fast-moving belt should accelerate this process. So where have all the sunspots been? The solar minimum of 2008-2009 was unusually deep and now the sun appears to be on the verge of a weak solar cycle. Instead of boosting sunspots, Hathaway believes that a fast-moving Conveyor Belt can instead suppress them "by counteracting magnetic diffusion at the sun's equator." He describes the process in detail in *Science* ("Variations in the Sun's Meridional Flow over a Solar Cycle," 12 March 2010, v327, 1350-1352).

The second surprise has to do with the bottom of the Conveyor Belt. SOHO can only clock the motions of the visible top layer. The bottom is hidden by ~200,000 kilometers of overlying plasma. Nevertheless, an estimate of its speed can be made by tracking sunspots. "Sunspots are supposedly rooted to the bottom of the belt," says Hathaway. "So the motion of sunspots tells us how fast the belt is moving down there." He's done that—plotted sunspot speeds vs. time since 1996—and the results don't make sense. "While the top of the conveyor belt has been moving at record-high speed, the bottom seems to be moving at record-low speed. Another contradiction."



Above: An artist's concept of the Solar Dynamics Observatory (SDO). Launched in Feb. 2010, SDO will be able to look inside the sun to study the conveyor belt in greater detail, perhaps solving the mysteries Hathaway and Rightmire have uncovered.

Could it be that sunspots are not rooted to the bottom of the Conveyor Belt, after all? "That's one possibility" he notes. "Sunspots could be moving because of dynamo waves or some other phenomenon not directly linked to the belt."

What researchers really need is a good look deep inside the sun. NASA's Solar Dynamics Observatory, launched in February 2010, will provide that when its instruments come online later this year. SDO is able to map the sun's interior using a technique called helioseismology. SOHO can do the same thing, but not well enough to trace the Great Conveyor Belt all the way around. SDO's advanced sensors might reveal the complete circuit. And then...? "It could be the missing piece we need to forecast the whole solar cycle," says Hathaway.

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### 600 feet (183 metres) Below Antarctic Ice Where Nothing Should Live, NASA Catches a Shrimp - March 14/10 credit Associated Press, Washington

In a surprising discovery about where higher life can thrive, scientists for the first time found a shrimp-like creature and a jellyfish frolicking beneath a massive Antarctic ice sheet. Six hundred feet (183 metres) below the ice where no light shines, scientists had figured nothing much more than a few microbes could exist.

That is why a team from the National Aeronautics and Space Administration was surprised when they lowered a video camera to get the first long look at the underbelly of an ice sheet in Antarctica. A curious shrimp-like creature came swimming by and then parked itself on the camera's cable. Scientists also pulled up a tentacle they believe came from a foot-long jellyfish.

"We were operating on the presumption that nothing's there," said NASA ice scientist Robert Bindschadler, who will be presenting the initial findings and a video at an American Geophysical Union meeting Wednesday. "It was a shrimp you'd enjoy having on your plate." "We were just gaga over it," he said of the 3-inch-long (76-millimeter, orange critter starring in their two-minute video.



This video frame grab image provided by NASA, taken in Dec. 2009, shows a Lyssianasid amphipod, which is related to a shrimp,

The video is likely to inspire experts to rethink what they know about life in harsh environments. And it has scientists musing that if shrimp-like creatures can frolic below 600 feet (183 metres) of Antarctic ice in subfreezing dark water, what about other hostile places? What about Europa, a frozen moon of Jupiter?

"They are looking at the equivalent of a drop of water in a swimming pool that you would expect

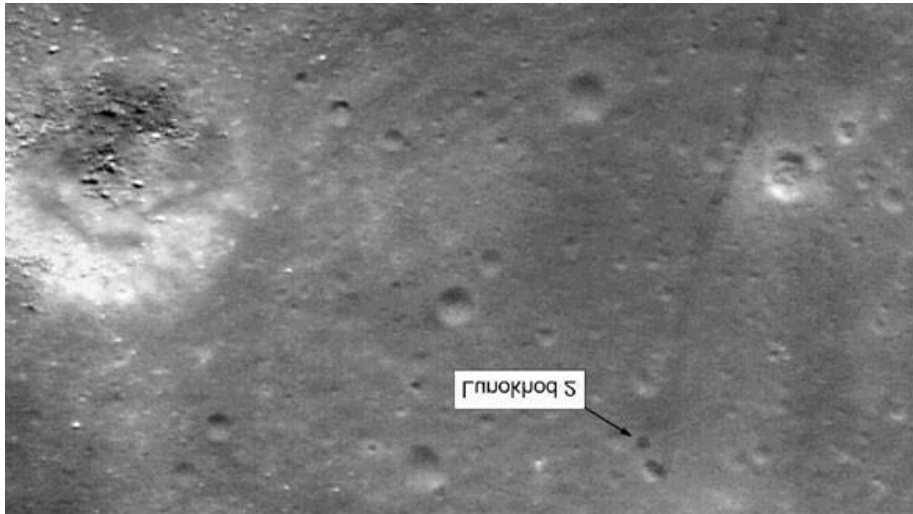
nothing to be living in and they found not one animal but two," said biologist Stacy Kim of the Moss Landing Marine Laboratories in California, who joined the NASA team later. "We have no idea what's going on down there." Microbiologist Cynan Ellis-Evans of the British Antarctic Survey called the finding intriguing. "This is a first for the sub-glacial environment with that level of sophistication," Ellis-Evans said. He said there have been findings somewhat similar, showing complex life in retreating ice shelves, but nothing quite directly under the ice like this. Ellis-Evans said it is possible the creatures swam in from far away and do not live there permanently. But Kim, who is a co-author of the study, doubts it. The site in West Antarctica is at least 12 miles (20 kilometres) from open seas. Bindschadler drilled an 8-inch-wide (200-millimeter) hole and was looking at a tiny amount of water. That means it's unlikely that that two critters swam from great distances and were captured randomly in that small of an area, she said.

Yet scientists were puzzled at what the food source would be for these critters. While some microbes can make their own food out of chemicals in the ocean, complex life like the amphipod can't, Kim said. So how do they survive? That's the key question, Kim said. "It's pretty amazing when you find a huge puzzle like that on a planet where we thought we know everything," Kim said.

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### Canadian Astronomer Spots Soviet Rover on Moon— March 17/10 credit CBC

Phil Stooke of the University of Western Ontario spotted tracks made 37 years ago by Lunokhod 2, a Soviet moon rover, on this new image from the U.S. Lunar Reconnaissance Orbiter. The tracks can be seen running up from the bottom right of the photo then veering left past a crater. (University of Western Ontario/NASA)



Phil Stooke combed through data and images of the moon's surface from the Lunar Reconnaissance Orbiter that NASA released Monday.

Stooke compared the images to his own recently published reference book on moon geography, *The International Atlas of Lunar Exploration*,

and pinpointed the location of the Soviet rover Lunokhod 2. "The tracks were visible at once," said Stooke, in a statement.

The location of the rover was already known through laser ranging experiments, but there's no telescope on Earth or in Earth orbit powerful enough to actually see it. "We knew within a few kilometres where it was. The laser beam spreads out a bit. It's not a pinpoint on the moon," Stooke said in an email.

The Lunar Reconnaissance Orbiter is taking pictures of the moon from its orbit about 50 kilometres above the surface. Its one-year mission is to produce a comprehensive moon map.

The Soviet Union landed Lunokhod 2 on the moon in January 1973, a month after the last American moonwalk. As the name suggests, it was the second of two solar-powered robotic rovers the Soviets sent to the moon.

#### Record-setting trip on lunar surface

The Lunokhod rovers were the first remote-controlled vehicles to travel on an extraterrestrial body and still hold the record for longest rover trip at 35 kilometres. (The Mars rovers Spirit and Opportunity have travelled 7.7 kilometres and 19.5 kilometres, respectively.) Lunokhod 2's mission was to collect images from the moon, observe X-rays from the sun, study the moon's soil and measure its magnetic fields. "The value here is partly the visual identification, but also the tracks, which will allow a detailed route map to be drawn for the first time," Stooke said. "Knowing the history of the mission, it's possible to trace the rover's activities in fine detail. We can see where it measured the magnetic field, driving back and forth over the same route to improve the data," he said. "And we can also see where it drove into a small crater, and accidentally covered its heat radiator with soil as it struggled to get out again. That ultimately caused it to overheat and stop working. And the rover itself shows up as a dark spot right where it stopped," said Stooke.

NASA released the first images from the Lunar Reconnaissance Orbiter in July 2009, revealing the landing sites of five of the six Apollo missions.

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## Record-breaking Collisions Mark Start of Research at the Large Hadron Collider— March 30/10 credit Science and Technology Facilities, UK

Scientists at the Large Hadron Collider (LHC) at CERN, Geneva, are celebrating after achieving another world first today — proton collisions at 7 trillion electron volts (TeV). This significant milestone, the highest energies ever achieved by a man-made particle accelerator (3.5 TeV per proton beam), marks the start of a 2-year campaign that could see scientists make new discoveries about the universe and answer some of the unresolved questions in physics.



This photograph shows a view down the LHC tunnel, located at CERN near Geneva, Switzerland. Maximilien Brice/CERN

"Achieving collisions at 7 TeV marks the start of a new era in physics research," said John Womersley, particle physicist and director of science programs at the Science and Technology Facilities Council (STFC), which funds the United Kingdom's particle physics program. "The LHC aims to explore the nature of the universe just moments after the Big Bang, and it will increase our understanding of how it was created, what it is made of, and how it will

evolve. During the coming months, scientists will use data collected at these high energies first to cross-check data and theories from previous experiments, and then to search for particles and forces that we know must exist in the universe but have never been observed. In the next couple of years, this could lead to the discovery of a new law of physics called supersymmetry — which could explain the dark matter that seems to dominate our universe — and even to the discovery of the elusive Higgs boson particle."

"It's a great day to be a particle physicist," said Rolf Heuer, CERN director general. "A lot of people have waited a long time for this moment, but their patience and dedication are starting to pay dividends. The LHC has a real chance over the next 2 years of discovering supersymmetric particles and possibly giving insights into the composition of about a quarter of the universe."

CERN will run the LHC at 7 TeV for 18 months to 2 years to deliver enough data to the A Toroidal LHC Apparatus (ATLAS), Compact Muon Solenoid (CMS), A Large Ion Collider Experiment (ALICE), and LHC beauty (LHCb) experiments to make significant advances across a wide range of physics areas. As soon as scientists have rediscovered the known standard model particles, a necessary precursor to looking for new physics, the LHC experiments will then start the systematic search for the Higgs boson.

With the amount of data expected, called one inverse femtobarn by physicists, the combined analysis of ATLAS and CMS will be able to explore a wide mass range, and there's even a chance of discovering the Higgs boson if it has a mass near 160 GeV (gigaelectron volts). If it's much lighter or very heavy, it will be more difficult to find in the LHC's first run.

For supersymmetry, ATLAS and CMS will each have enough data to double today's existing sensitivity to certain new discoveries. Experiments today are sensitive to some supersymmetric particles with masses up to 400 GeV. Such a high data volume at the LHC pushes the discovery range up to 800 GeV.

Even at the more exotic end of the LHC's potential discovery spectrum, this LHC run will extend the current reach by a factor of two. LHC experiments will be sensitive to new massive particles, indicating the presence of extra dimensions up to masses of 2 TeV — today's reach is around 1 TeV. "There is a whole new landscape of physics to explore at these energies," said Jon Butterworth from the University College London. "Somewhere in that landscape nature has hidden the way forces are unified and how particles get mass. Today the LHC gets us over the horizon, and we start our exploration!" "For the last two decades, we have been preparing to make this leap into exploring a new realm of nature," said Jordan Nash from Imperial College London. "Our studies of the universe and the particles we have been able to produce in accelerators up until now show us that there are important pieces missing in our understanding of the basic building blocks of the universe. Operating the LHC at these energies much higher than ever achieved before will allow us to search for these and find out more about what our universe consists of. Our first taste of data at low- energy operation of the LHC has shown us that our detectors are ready to capture and analyze the data with exquisite precision, and we are all standing by ready to see what nature has in store for us." Once the LHC has completed this long run of 18-24 months, there will be a long shutdown of roughly a year during which the LHC will be upgraded and prepared for running at its design energy of 14 TeV. Traditionally, CERN has operated its



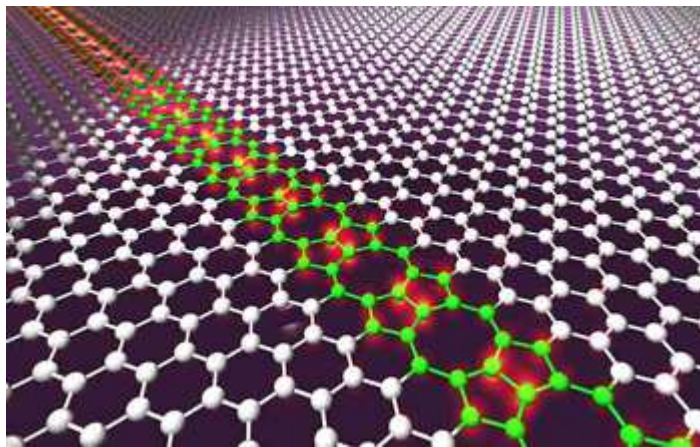
accelerators on an annual cycle, running for 7 to 8 months with a 4-to-5-month shutdown each year. Being a cryogenic machine operating at very low temperature, the LHC takes about a month to bring up to room temperature and another month to cool down. A 4-month shutdown as part of an annual cycle no longer makes sense for such a machine, so CERN has decided to move to a longer cycle with longer periods of operation accompanied by longer shutdown periods when needed.

"Two years of continuous running is a tall order both for the LHC operators and the experiments, but it will be well worth the effort," said Rolf Heuer. "By starting with a long run and concentrating preparations for 14 TeV collisions into a single shutdown, we're increasing the overall running time over the next 3 years, making up for lost time and giving the experiments the chance to make their mark gone around the nucleus as many times as the Earth has gone around the sun since the solar system was created."

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### **A Tiny Defect That May Create Smaller, Faster Electronics**— March 30/10 credit NSF

Researchers at the University of South Florida have developed a technique to turn defects in graphene into tiny metallic wires



An artist's conception of a row of intentional molecular defects in a sheet of graphene.

When most of us hear the word 'defect', we think of a problem that has to be solved. But a team of researchers at the University of South Florida (USF) created a new defect that just might be a solution to a growing challenge in the development of future electronic devices.

The team lead by USF Professors Matthias Batzill and Ivan Oleynik, whose discovery was published yesterday in

the journal *Nature Nanotechnology*, have developed a new method for adding an extended defect to graphene, a one-atom-thick planar sheet of carbon atoms that many believe could replace silicon as the material for building virtually all electronics.

It is not simple to work with graphene, however. To be useful in electronic applications like integrated circuits, small defects must be introduced to the material. Previous attempts at making the necessary defects have either proved inconsistent or produced samples in which only the edges of thin strips of graphene or graphene nanoribbons possessed a useful defect structure. However, atomically-sharp edges are difficult to create due to natural roughness and the uncontrolled chemistry of dangling bonds at the edge of the samples.

The USF team has now found a way to create a well-defined, extended defect several atoms across, containing octagonal and pentagonal carbon rings embedded in a perfect graphene sheet. This defect acts as a quasi-one-dimensional metallic wire that easily conducts electric current. Such defects could be used as metallic interconnects or elements of device structures of all-carbon, atomic-scale electronics.

So how did the team do it? The experimental group, guided by theory, used the self-organizing properties of a single-crystal nickel substrate, and used a metallic surface as a scaffold to synthesize two graphene half-sheets translated relative to each other with atomic precision. When the two halves merged at the boundary, they naturally formed an extended line defect. Both scanning tunneling microscopy and electronic structure calculations were used to confirm that this novel one-dimensional carbon defect possessed a well-defined, periodic atomic structure, as well as metallic properties within the narrow strip along the defect.

This tiny wire could have a big impact on the future of computer chips and the myriad of devices that use them. In the late 20th century, computer engineers described a phenomenon called Moore's Law, which holds that the number of transistors that can be affordably built into a computer processor doubles roughly every two years. This law has proven correct, and society has been reaping the benefits as computers become faster, smaller, and cheaper. In recent years, however, some physicists

and engineers have come to believe that without new breakthroughs in new materials, we may soon reach the end of Moore's Law. As silicon-based transistors are brought down to their smallest possible scale, finding ways to pack more on a single processor becomes increasingly difficult.

Metallic wires in graphene may help to sustain the rate of microprocessor technology predicted by Moore's Law well into the future. The discovery by the USF team, with support from the National Science Foundation, may open the door to creation of the next generation of electronic devices using novel materials. Will this new discovery be available immediately in new nano-devices? Perhaps not right away, but it may provide a crucial step in the development of smaller, yet more powerful, electronic devices in the not-too-distant future.

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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

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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.

### Big Brains on a Little Chip! Courtesy of the SpacePlace

Spacecraft are getting smaller and smaller too. The same new technology that lets computers be so small can be used to make robotic spacecraft very small. We call them robotic spacecraft because they don't carry any people. We send them off to do our work, while we stay home. As long as the spacecraft don't have to carry people, they can be very tiny and still do lots of useful work, traveling far from Earth and finding out all sorts of interesting things about other planets, moons, asteroids, comets, and space. This mini-chip technology will be used on several spacecraft, including missions going to Pluto, Europa (a moon of Jupiter), the Sun, Comet Tempel 1, and Mars. Your job today is to guide the little spacecraft on its journey to the sun, planets, moons, and comets.



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## 10. The Sky This Month

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

The sky this month March 2010-03-06

Welcome to spring everyone. Even though last month ushered in the official date, this month promises some milder nights and clear dark skies. Can you tell I'm being hopeful about the rain? As the month opens we get an early evening treat with our two innermost planets. With a good view of the western horizon bright Venus at magnitude -3.9 guides us towards dim little Mercury. The two planets lie only 3° apart low in the west and rise together for the first week as the sun sets. Then innermost Mercury starts to chase the sun because of its shorter orbit.

Mars is a great performer this month in the constellation Cancer the Crab for those whose main instrument is 8" or better. It is not bright, shining only at Magnitude 0.2 on its eastern trek towards Leo. By the time it almost reaches the big lion its magnitude has diminished to 0.7. If you are using binoculars you don't have to be envious of the big guys, Mars and the Beehive lie 1° apart in the middle of April and look great in the same field of view.

Saturn is always a great sight through a telescope when it is up and this month is no exception. Although it was brighter on March 21st the big ringed giant will provide good views around local midnight for most of the month. Saturn's large moon Titan circles the planet two times a month. Watch for it to start the month on the western side of Saturn and move to the eastern side on **April 7th**. By the **14th** it is moving from Saturn towards its western side, and back on Saturn's eastern side on **April 22**.

While it is on the eastern side look southeast of the big moon to see 12th magnitude Iapetus. This little moon brightens and dims as it circles Saturn due to its light and dark sides. The light side reflects almost 90% of the light that falls on it while the dark side only bounces back roughly 10%. The moon appears brightest near the end of April when it is on the western side of Saturn and the bright side faces the earth and the little moon is south of Titan.

Our typical morning "Star" is Venus but this month the role is taken on by Jupiter. The gas giant starts the month almost lost in the early morning glow around 5:00am local time but is easily visible by month's end at Magnitude -2.1. On the morning of **April 11th** Jupiter is joined by a waning crescent moon in the east, just before sunrise.

For a planetary challenge try recreating Johann Galle's discovery of 164 years ago by spotting Neptune. Neptune was first discovered by Galle from Berlin Germany on September 23, 1846. The big blue gas giant glows at Magnitude 7.9 and can be found between 5th magnitude Mu Capricorni and 38 Aquarii. You will need a telescope or good binoculars to share in the site Galle saw so long ago.

If planets are not your thing, April has an asteroid and a meteor shower in store for you as well. You can share in the discovery of another German astronomer, Heinrich Wilhelm Olbers who discovered the asteroid Vesta in March of 1807. Glowing at magnitude 7, Vesta can easily be found 1° away from 3rd magnitude Epsilon Leonis in Leo. This star is on the western most edge of Leo's sickle asterism. Vesta has a formal designation of 4 Vesta. The little asteroid's mean diameter is about 530 km and is the second largest asteroid in the asteroid belt between Mars and Jupiter. Its mass is estimated to be 9% of the total mass of all the asteroids in the belt.

For meteor lovers the Lyrids put on a pretty decent show this month. The first quarter moon will be setting when the radiant in Lyra is in the zenith overhead. The lyrids don't normally put on a spectacular show but with a dark sky and a radiant overhead, viewers could see 15 to 25 meteors grace their eastern sky.

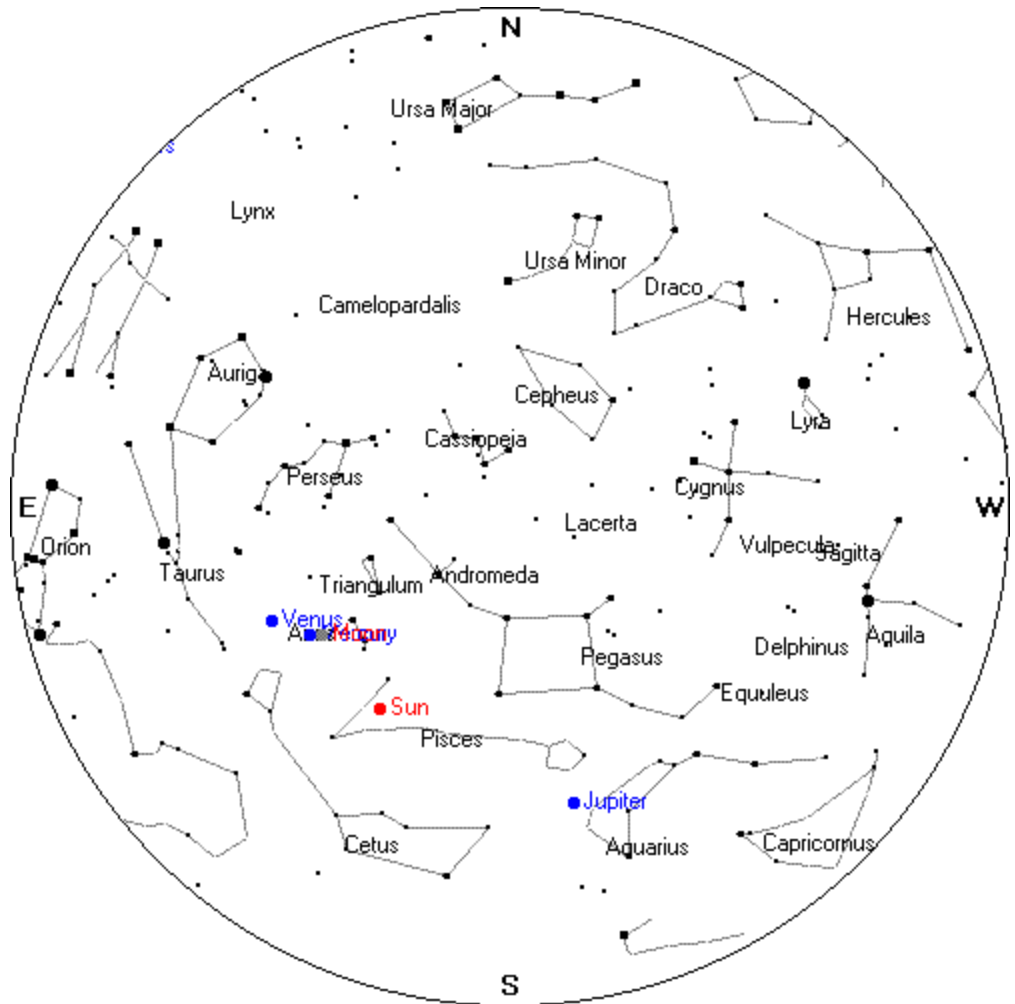
The summer star party is coming and many club members are out searching for a dark site. The club is also looking to do a little observing for the public on International astronomy day on **April 24th**. I hope you can all get out to enjoy all that this spring has to offer. Till then remember astronomy is looking up!

Apr 6	02:37 AM PST	Last Quarter Moon
Apr 8	04:00 PM PST	Mercury at greatest Eastern elongation 19° The best appearance of Mercury this year
Apr 14	05:29 AM PST	New Moon
Apr 15	04:00 PM PST	Moon is 1 1/2° North of Mercury
Apr 21	11:20 AM PST	First Quarter Moon
Apr 22	Early AM	Lyrid Meteor Shower Peaks



Apr 24	All Day	International Astronomy Day
Apr 28	05:18 AM PST	Full Moon

Sky Chart —Here's your mid-April 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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