Clear Skies

Volume 17 Issue 3 September 2011

President:president@starfinders.ca
Web: www.starfinders.ca
Editor: newsletter@starfinders.ca

Categories

Quick Links

1. Editor Greetings!

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

Welcome to all new and returning members. This is YOUR club and we always accepting of your input, enthusiam and new ideas on how to make our club even better. You can email your thoughts to either the president@starfinders.ca or the vice-president@starfinders.ca . For our newer members, take a look at http://www.starfinders.ca/membership.htm to familiarize yourself with the club and what your membership entails.

For those of us who couldn't make the 16th Annual Island Star Party, don't fret, Nancy wrote about it in the "Social Highlights" section. Also, this upcoming Social on Sept 28th focuses on the ISP. It is "Show and Tell" (viewing of the ISP Photos and Videos). For a sneek peek see Joe C and John M photos which have already been posted on their site: http://rascvic.zenfolio.com/isp2011 thanks guys. If we have the time there's a great video called "Are We The Aliens?" which we can cap the evening off with.

And finally memberships are due for returning members who did not attend the past ISP. We look forward to having you in the club and hope you will return. To pay your dues see instructions on the following page http://www.starfinders.ca/membership.htm

Many thanks to this month's contributors Moe R, Bryon T, Joe C, Nancy K and John M.

back

2. Socials

Socials are held on the 4th Wednesday of each month (except for July and August) at the home of Bryon and Freda.

Click on the 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 September 28th**
Feature: '"ISP Show and Tell" viewing of ISP Photos and if time permits, a video.
Come on out and show off your pictures of the event or your astro photos.

back

ISP Highlights

By Nancy Kirshfelt

The Island Star Party of 2011 was held at Bright Angel Park near Cowichan Station. The skies were very clear and the weather was amazing. Although there was a lot of moisture in the air (and so on the telescopes), some good viewing and a good time was had by all who attended. There was a very good turnout on both Friday and Saturday with a total of 56 adults and 7 children. Friday night was registration and getting tents and telescopes set up. Ed Nicholas did a telescope walk Friday and Saturday. Many people enjoyed a very informative nature walk by Kathleen Johnson and a lecture by Dr. Andrew Woodsworth on "A Billion Dollar Radio Observatory in the Chilean Andes" in the evening. There were many great door prizes. The draw for a telescope donated by Mr. And Mrs. Robert Henderson was won by Darryl Whitworth. Sandy Clark's telescope was donated to the club by Tom Graham of Salt Spring Island. A raffle was held for it and was won by Harley Abram. Harley was so pleased to win the telescope and to take it back to his home in Chemainus, where Sandy lived and painted her beautiful murals. Thank you to all who donated their time and energy to this very worthwhile and successful event!

back

3. Upcoming Events

Every Saturdays & Wednesdays* 1:00-1:30 PM, CHLY 101.7 FM
Not Rocket Science (NRS) is a thirty minute weekly radio show about the science of everything and everything science. Dial them up or listen to past podcasts at
http://chly.dailysplice.com/notrocketscience/

Transformers: Dark of The Moon: The IMAX Experience ENDING Thursday, Sept. 22 | Playing 7pm Sun - Wed & 8pm Thurs – Sat, Victoria B.C.
The Autobots Bumblebee, Ratchet, Ironhide and Sideswipe led by Optimus Prime, are back in action, taking on the evil Decepticons, who are determined to avenge their defeat in 2009's Transformers: Revenge of the Fallen. In this new movie, the Autobots and Decepticons become involved in a perilous space race between the U.S. and Russia, and once again human Sam Witwicky (Shia LaBeouf) has to come to the aid of his robot friends. There's new characters too, including a new villain in the form of Shockwave, a longtime "Transformers" character who rules Cybertron while the Autobots and Decepticons battle it out on Earth.

Other Star Parties in B.C:

October 1, 2011. KAS Star Party. Stake Lake Observatory. Kamloops Astronomical Society. More Info:
http://kamloopsastronomy.ca/

NASA Launches credit NASA.Com:

Updated - Sept. 10, 2011 at 12:30 p.m. EDT:
NASA's twin lunar Gravity Recovery and Interior Laboratory (GRAIL) spacecraft lifted off from Cape Canaveral Air Force Station in Florida at 9:08 a.m. EDT Saturday, Sept. 10.

back

4. This Month In History

Courtesy of: Windows2universe.org

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 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

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.

back

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".

Cool Video of Dawn Flying Around VESTA: http://www.jpl.nasa.gov/video/index.cfm?id=1020

John and Joe's Photos of the 2011 ISP: John McDonald and I have posted our astronomical photos taken at the ISP to Victoria Centre's our online photo hosting service. You can find all of them in the following collection: http://rascvic.zenfolio.com/isp2011 Thanks again for a wonderful star party. I really enjoyed myself!

View Of Earth From The Space Station

Experience what it feels like to fly over planet Earth in this cool time-lapse video taken from the front of the International Space Station as it orbits our planet at night. This movie begins over the Pacific Ocean and continues over North and South America before entering daylight near Antarctica. http://www.youtube.com/watch?feature=player_embedded&v=74mhQyuyELQ#!

back

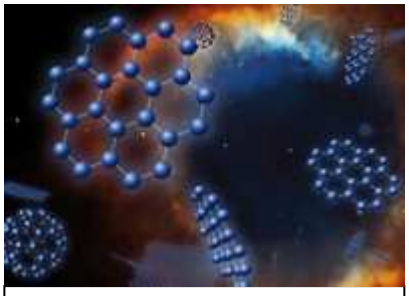
6. Featured Articles

Articles

RETURN TO CATEGORIES

1. Has Graphene Been Detected in Space?
2. Astrophysicsts Identify Missing Fuel for Galatic Star Formation
3. Dwarf Planet Mysteries Beckon to New Horizons
4. Three UVIC Scientists Earn National Honours
5. The Secret Lives of Solar Flares

Has Graphene Been Detected in Space? Aug 13/11 Credit *NOAO, Tucson, Arizona*



Artist's impression of the graphenes and fullerenes found in a planetary nebula. The detection of graphenes and fullerenes around old stars as common as our Sun suggests that these molecules and other allotropic forms of carbon may be widespread in space. *Image credits: IAC; original image of the Helix Nebula: NASA, NOAO, ESA, the Hubble Helix Nebula Team, M. Meixner, STScI, & T.A. Rector, NRAO.*

A team of astronomers using the Spitzer Space Telescope has reported the first extragalactic detection of the C70 fullerene molecule, and the possible detection of planar C24 (a piece of graphene) in space. Letizia Stanghellini and Richard Shaw from the National Optical Astronomy Observatory (NOAO) in Tucson, Arizona, describe how collisional shocks powered by the winds from old stars in planetary nebulae could be responsible for the formation of fullerenes (C60 and C70) and graphene (planar C24).

Planetary nebulae originate from stars similar to our Sun that have reached the end of their lives and are shedding shells of gas into space. In this case, the planetary nebulae are located in the Magellanic Clouds, two satellite galaxies to our own Milky Way that are best seen from the Southern Hemisphere. At the distance of the Magellanic Clouds, planetary nebulae appear as small fuzzy blobs. However, unlike planetaries in our own Milky Way Galaxy whose distances are uncertain, the distance to planetaries in the Magellanic Clouds can be determined to better than 5 percent. With such accurate distances, the research team determined the true luminosity of the stars, and confirmed that the objects are, indeed, planetary nebulae and not some other object in the astrophysical zoo.

Fullerenes, or Buckyballs, are known from laboratory work on Earth and have many interesting and important properties. Fullerenes consist of carbon atoms arranged in a 3-D sphere similar to the geodesic domes popularized by Buckminster Fuller. The C70 fullerene can be compared with a rugby ball while C60 is compared to a soccer ball. Both of these molecules have been detected in the sample. Graphene (planar C24) is a flat sheet of carbon atoms, one atom thick, that has extraordinary strength, conductivity, elasticity, and thinness. Cited as the thinnest substance known, graphene was first synthesized in the lab in 2004 by Geim and Novoselov, for which they received the 2010 Nobel Prize in physics. "If confirmed with laboratory spectroscopy — something that is almost impossible with the present techniques — this would be the first detection of graphene in space," said García-Hernández from NOAO.

The team has proposed that fullerenes and graphene are formed from the shock-induced (i.e., grain-grain collisions) destruction of hydrogenated amorphous carbon grains (HACs). Such collisions are expected in the stellar winds emanating from planetary nebulae, and this team sees evidence for strong stellar winds in the ultraviolet spectra of these stars. "What is particularly surprising is that the existence of these molecules does not depend on the stellar temperature, but on the strength of the wind shocks," said Stanghellini.

The Small Magellanic Cloud is particularly poor in metals, but this sort of environment favors the evolution of carbon-rich planetary nebulae, which turns out to be a favorable place for complex carbon molecules. The challenge has been to extract the evidence for graphene from Spitzer data. "The Spitzer Space Telescope has been amazingly important for studying complex organic molecules in stellar environments," said Stanghellini. "We are now at the stage of not only detecting fullerenes and other molecules, but also starting to understand how they form and evolve in stars."

"We are planning ground-based follow-up through the NOAO system of telescopes, said Shaw. "We hope to find other molecules in planetary nebulae where fullerene has been detected to test some physical processes that might help us understand the biochemistry of life."

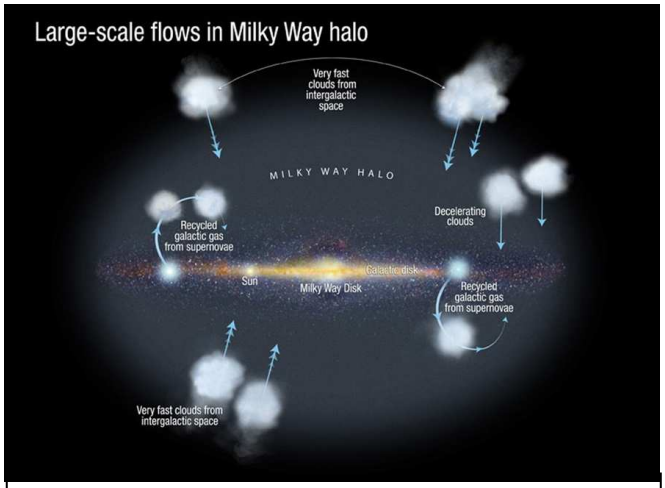
back

Astrophysicists Identify Missing Fuel for Galactic Star Formation–Aug 29/11

credit University of Notre Dame, Indiana

The Milky Way will have the fuel to continue forming stars, thanks to massive clouds of ionized gas raining down from its halo and intergalactic space. This is the conclusion of a new study by Nicolas Lehner and Christopher Howk from the University of Notre Dame, Indiana.

Using the Cosmic Origins Spectrograph, one of the newest instruments on the NASA/ESA Hubble Space Telescope, these researchers measured for the first time the distances to fast-moving clouds of ionized gas previously seen covering a large fraction of the sky. These fast-moving clouds reside in the distant reaches of the Milky Way and contain huge quantities of gas.



This diagram shows the large-scale flows of gas in the Milky Way halo of faint stars and hot gas. *Illustration: NASA/ESA/A. Feild (STScI)*

The Milky Way would rapidly change its gas into stars if no supply of new matter were available to replenish the gas. Astronomers have hypothesized that the ionized fast-moving gas clouds could be this reservoir of gas, but it was not known if they were interacting with the Milky Way.

"Our findings explain why the Milky Way can keep having star formation," Lehner said. "Knowing the distances to these clouds tells us where the gaseous fuel is for forming stars over billions of years."

Gas clouds can be identified and studied because elements in the cloud absorb small amounts of light from a star or other light source as it passes through a cloud on its way to Earth. The characteristic "fingerprint" left in the spectrum allows astronomers to determine the properties of the gas.

Star formation in the Milky Way
Earlier studies of these fast-moving ionized clouds used light from quasars, which are too far away to mark the clouds' locations. To solve the problem, Lehner and Howk identified 27 stars around the Milky Way whose distances were known and used Hubble to take line-of-sight readings of light coming from them.

Results from the stellar sample showed the ionized clouds largely resided in the Milky Way's halo. The authors concluded that these flows of ionized gas are within about 1 galactic radius (40,000 light-years) of Earth. The new Hubble observations revealed the presence of ionized gas in half the stellar samples, comparable to the fraction observed toward more distant quasars.

The gas clouds are not uniformly distributed around the galaxy, but rather collected in different areas. They cover only part of our galactic sky, analogous to the partial coverage of the sky on a partly cloudy day on Earth. This research also confirmed models that predicted gas falling into the Milky Way slows as it approaches. Clouds closer to the galaxy seem to have been decelerated and do not move as fast as those farther away, much like a meteorite slowing as it enters Earth's atmosphere.

"We know now where is the missing fuel for galactic star formation," Lehner said. "We now have to learn how it got there."

back

Dwarf Planet Mysteries Beckon to New Horizons –Sept 2/11 *credit NASA Science*

At this very moment one of the fastest spacecraft ever launched -- NASA's New Horizons -- is hurtling through the void at nearly one million miles per day. Launched in 2006, it has been in flight longer than some missions last, and still has four more years of travel to go. New Horizons headed for the lonely world of Pluto on the outer edge of the solar system.

Although astronomers now call Pluto a dwarf planet, "it's actually a large place, about 5,000 miles around at the equator," says Alan Stern, principal investigator for the mission. "And it's never been explored." Indeed, no spacecraft has ever visited Pluto or any dwarf planet.

"This is a whole new class of worlds," says Stern. "To understand the solar system, we need to understand worlds like Pluto."

Pluto is a resident of the Kuiper Belt, a vast region beyond the orbit of Neptune. Stern believes "the Kuiper Belt contains a thousand dwarf planets or more – a whole zoo of them! Dwarf planets are, in fact, the most numerous class of planets in the solar system, and probably in the whole universe."

Left: Dwarf Planet Mysteries (molasses, 200px)
The Hubble Space Telescope discovered strange molasses-colored markings on Pluto.

Pluto is a world of mysteries. For one thing, Stern wonders, what are the molasses-colored patches on Pluto's surface seen by the Hubble Space Telescope? Some scientists think they could be deposits of primordial organic matter. "New Horizon's spectrometers will help us identify the kinds of organic molecules on Pluto. We expect to find something pretty interesting."

Hubble recently contributed more intrigue by spotting a new moon circling Pluto -- bringing the total to four. Composite Hubble images of Pluto now resemble a miniature planetary system. New Horizons will hunt for even more moons as it approaches the dwarf planet.

The probe is primed for detective work -- equipped with instruments capable of "knocking the socks off anything Voyager carried." In addition to state of the art spectrometers, New Horizons wields one of the largest and highest resolution interplanetary telescopes ever flown. It's called LORRI, short for Long-Range Reconnaissance Imager. "At closest approach to Pluto – about 10,000 km up – LORRI can resolve details almost as well as a spy camera. The view will be incredible. If we flew this instrument over Earth at that altitude, we could see individual buildings and their shapes." What will we see on Pluto? Some researchers say we could spot icy geysers2. Some say we could see those surface deposits of organic material. Stern says simply, "There could be all kinds of surprises! It's a first

exploration of a new kind of planet."

Heading far from home, "New Horizons is like Noah's Ark – our ship has two of everything, for backup," says Stern. "Two heaters, two computer systems, two of everything except the scientific instruments. And even those have capabilities to back each other up." When New Horizons reaches Pluto it will have traveled 9 ½ years – longer than any spacecraft has ever flown to reach its main target. To save power and reduce wear and tear, it hibernates3 much of the time. But all systems will be ready to spring into action upon arrival in 2015.

back

Three UVic Scientists Earn National Honours–Sept 8 /11 *credit UVIC News*

Two University of Victoria scientists have joined the ranks of Canada's academic elite. Geologist Dante Canil and astrophysicist Julio Navarro have been elected fellows of the Royal Society of Canada for outstanding scholarly and scientific achievement. The distinction is considered Canada's highest academic honour.

The society has also awarded its 2011 Miroslaw Romanowski Medal to UVic climatologist Andrew Weaver for "his exceptional research achievements, scholarly writings and resolute efforts to share his knowledge on climate change [which have been] critically influential the world over."

Canil is an international leader in the study of the Earth's mantle, the super-heated layer of rock below the crust that makes up about 85 per cent of the planet's mass. His pioneer work has greatly expanded our understanding of volcanic rocks that host diamonds, ancient deep regions of the continents, and the evolution of oxygen in the Earth and atmosphere.

"A better understanding of diamond geology aids in the exploration of Canada's North where diamond deposits are concentrated," says Canil. "And the evolution of oxygen in the mantle—Earth's largest chemical reservoir—may be key to the rise of oxygen in the atmosphere over time, which led to the evolution of complex life forms on our planet, and possibly others."

Navarro is one of the world's leading astrophysicists whose research on galaxy formation and evolution—primarily using sophisticated computer simulations—has shaped our current understanding of how structures in the universe formed. He is especially well known for his work on dark matter, a mysterious substance that holds galaxies together.

"Cosmology is undergoing a golden age of discovery that promises to rewrite the most fundamental laws of physics," says Navarro. "It's only in the past few decades that humankind has been able to piece together a scientifically verifiable account of how the universe began and evolved. It's a privilege to be active in this field at this time."

Weaver is one of the world's leading authorities on climate change. He is recognized nationally and internationally as a leader in climate modelling and analysis and, in particular, as an expert on the role of the ocean in climate variability and change. His recent research on ancient climates has contributed significantly to our understanding of climate change and variability over the last 130,000 years of Earth history.

Weaver is also well known for his tireless efforts to engage the public on climate change issues. He is the author of two books for a general audience on climate change: Keeping our Cool: Canada in a Warming World (2008), and Generation Us: The Challenge of Global Warming (2011). Weaver has been a fellow of the Royal Society of Canada since 2001.

back

The Secret Lives of Solar Flares –Sept 19/11 *credit NASA Science*

One hundred and fifty two years ago, a man in England named Richard Carrington discovered solar flares. It happened at 11:18 AM on the cloudless morning of Thursday, September 1st, 1859. Just as usual on every sunny day, the 33-year-old solar astronomer was busy in his private observatory, projecting an image of the sun onto a screen and sketching what he saw. On that particular morning, he traced the outlines of an enormous group of sunspots. Suddenly, before his eyes, two brilliant beads of white light appeared over the sunspots; they were so bright he could barely stand to look at the screen.

Carrington cried out, but by the time a witness arrived minutes later, the first solar flare anyone had

ever seen was fading away. It would not be the last. Since then, astronomers have recorded thousands of strong flares using instruments ranging from the simplest telescopes in backyard observatories to the most complex spectrometers on advanced spacecraft. Possibly no other phenomenon in astronomy has been studied as much. After all that scrutiny, you might suppose that everything about solar flares would be known. Far from it. Researchers recently announced that solar flares have been keeping a secret.

"We've just learned that some flares are many times stronger than previously thought," says University of Colorado physicist Tom Woods who led the research team. "Solar flares were already the biggest explosions in the solar system—and this discovery makes them even bigger."
Click to view a ScienceCast video about the late phase of solar flares. [Youtube]

NASA's Solar Dynamics Observatory (SDO), launched in February 2010, made the finding: About 1 in 7 flares experience an "aftershock." About ninety minutes after the flare dies down, it springs to life again, producing an extra surge of extreme ultraviolet radiation. "We call it the 'late phase flare,'" says Woods. "The energy in the late phase can exceed the energy of the primary flare by as much as a factor of four." What causes the late phase? Solar flares happen when the magnetic fields of sunspots erupt—a process called "magnetic reconnection." The late phase is thought to result when some of the sunspot's magnetic loops re-form. A diagram prepared by team member Rachel Hock of the University of Colorado shows how it works.

The extra energy from the late phase can have a big effect on Earth. Extreme ultraviolet wavelengths are particularly good at heating and ionizing Earth's upper atmosphere. When our planet's atmosphere is heated by extreme UV radiation, it puffs up, accelerating the decay of low-orbiting satellites. Furthermore, the ionizing action of extreme UV can bend radio signals and disrupt the normal operation of GPS.

SDO was able to make the discovery because of its unique ability to monitor the sun's extreme UV output in high resolution nearly 24 hours a day, 7 days a week. With that kind of scrutiny, it's tough to keep a secret--even one as old as this.

back

7. 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 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 Editor and master of Astronomy 101 basics.

back

8. Kids Korner

If you have any ideas that might spark the interest of a young upcoming astronomer, please send your submissions to the editor.

See if you can Find 10 Differences in our Astronaut:

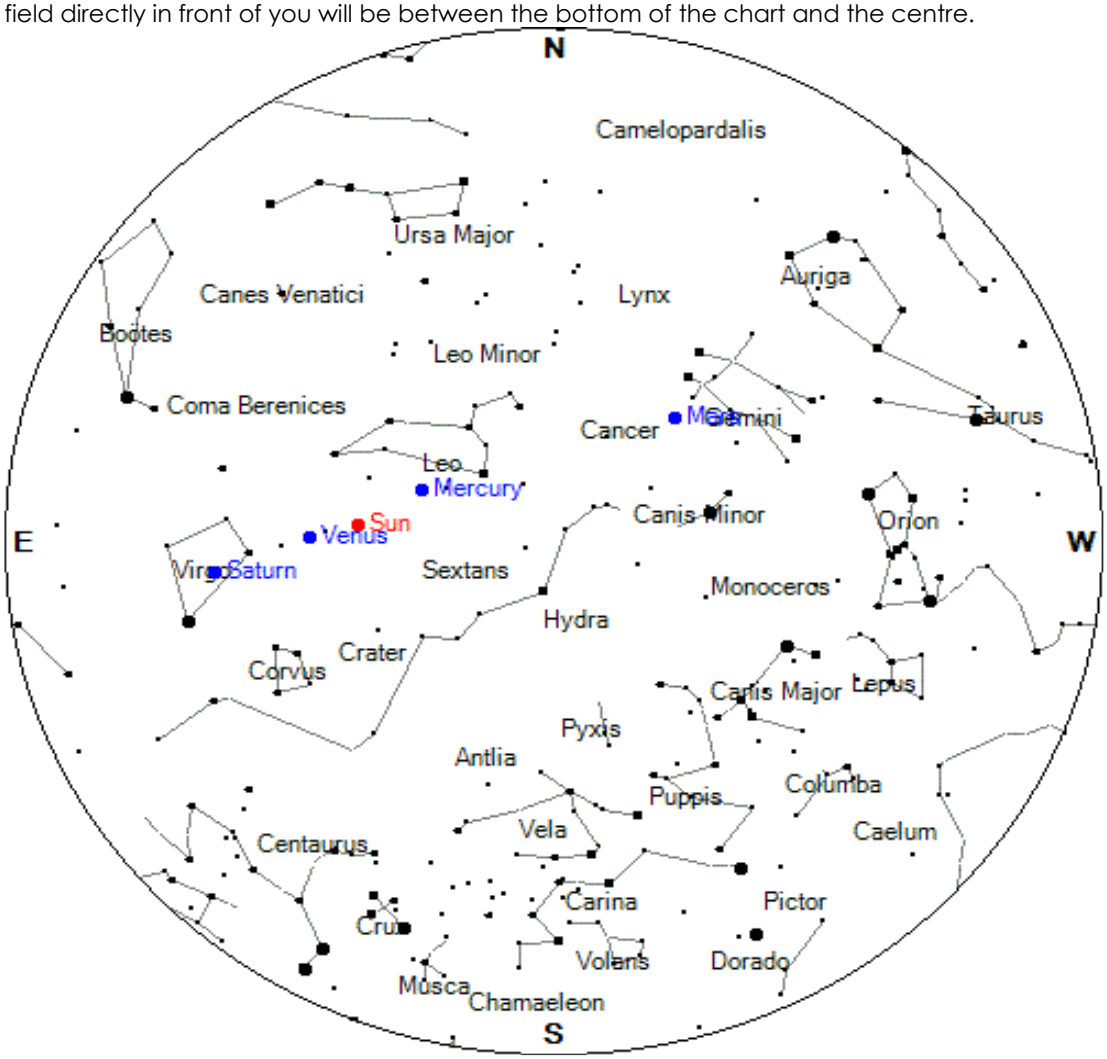
back

9. The Sky This Month

By Bryon Thompson

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

Sky Chart —Here's your mid-September 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

back