March 2010

Inside this Issue

S*T*A*R
P.O. Box 863
Red Bank, NJ 07701
On the web at:
http://www.starastronomy.org

Edited by: Bob Fowler

March's Meeting

The next meeting of S*T*A*R will be on Thursday, March 4th, 2010 and will feature Professor Saurabh W. Jha of Rutgers University. The subject of Professor Jah's presentation will be "Surveying the Universe with Supernovae". All are welcome. The meeting will begin promptly at 8:00pm at the Monmouth Museum on the Brookdale Community College campus.

Editor's Corner

Many thanks to Dave Nelson, Randy Walton, & Steve Fedor for contributing to this month's Spectrogram.

Reminder to pay membership dues $25/individual, $35/family. Donations are appreciated. Make payments to our treasurer Rob Nunn at a club meeting or mail a check payable to S*T*A*R Astronomy Society Inc to:

S*T*A*R Astronomy Society
P.O. Box 863
Red Bank, NJ 07701

March Issue

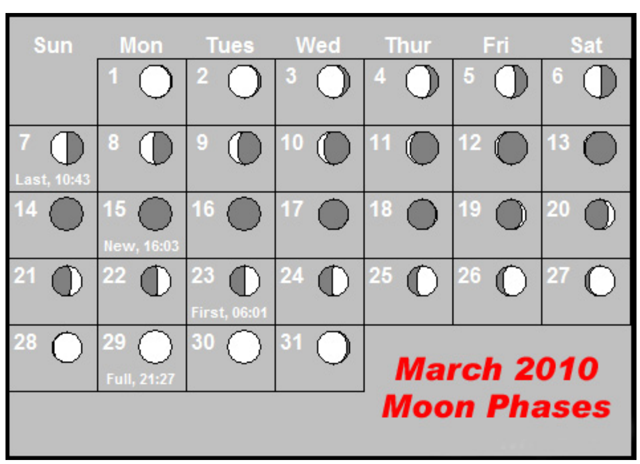
Please submit articles and contributions for the next *Spectrogram* by March 26.
Please email to fowler@verizon.net.

Calendar

- ❖Mar 4, 2010 – Surveying the Universe with Supernovae
- ❖Mar 19, 2010 – Pine Brook School Star Party
- ❖Mar 23, 2010 – Wyoming Elementary School Star Party
- ❖Apr 1, 2010 – April Meeting
- ❖Apr 22, 2010 – Nut Swamp Elementary School First Star Party
- ❖Jun 3, 2010 – Annual Business Meeting

Got Pix?
Like to Write?

Have you been out observing with your friends? Have you made any great astro-images? How about a story and pictures of your latest ATM project? If you have anything you'd like to share, email fowler@verizon.net and let



Pictures from the 1st Annual S*T*A*R Winter Social

Are you a S*T*A*R Member?

S*T*A*R is the proud owner of a monstrous 25” Dobsonian Obsession reflector – which members can gain access to!

Meetings are the first Thursday of each month, except July and August, at 8:00 PM at the Monmouth Museum on the Brookdale Community College campus. Meetings generally consist of lectures and discussions by members or guest speakers on a variety of interesting astronomical topics. S*T*A*R is a member of United Astronomy Clubs of New Jersey (UACNJ), the Astronomical League (AL), and the International Dark Sky Association (IDA).

Memberships: ( )Individual....$25 ( ) Family...$35

Name_______________________________________

Address_____________________________________

City______________________State___Zip________

Phone_______________________________________

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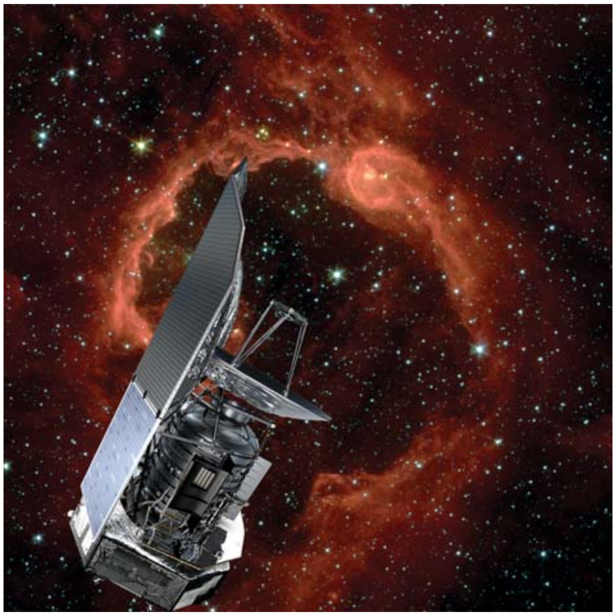
Make checks payable to: S*T*A*R Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701

Flipping the Lights on Cosmic Darkness

Exploring the universe is a bit like groping around a dark room. Aside from the occasional pinprick of starlight, most objects lurk in pitch darkness. But with the recent launch of the largest-ever infrared space telescope, it's like someone walked into the room and flipped on the lights.

Suddenly, those dark spaces between stars don’t appear quite so empty. Reflected in the Herschel Space Observatory's 3.5-meter primary mirror, astronomers can now see colder, darker celestial objects than ever before—from the faint outer arms of distant galaxies to the stealthy “dark asteroids” of our own solar system.

Many celestial objects are too cold to emit visible light, but they do shine at much longer infrared wavelengths. And Herschel can observe much longer infrared wavelengths than any space telescope before (up to 672 microns). Herschel also has 16 times the collecting area, and hence 16 times better resolution, than previous infrared space telescopes. That lets it resolve details with unprecedented clarity. Together, these abilities open a new window onto the universe.



The Herschel Space Observatory has 3.5-meter primary mirror, allowing astronomers to see colder, darker celestial objects than ever before.

”The sky looks much more crowded when you look in infrared wavelengths,” says George Helou, director of the NASA Herschel Science Center at Caltech. “We can't observe the infrared universe from the ground because our atmosphere blocks infrared light, and emits infrared itself. Once you get above the atmosphere, all of this goes away and suddenly you can look without obstruction.”

Herschel launched in May from the Guiana Space Centre in French Guiana aboard a European Space Agency Ariane 5 rocket. Since then, it has expanded the number of distant galaxies observed at far infrared wavelengths from a few hundred to more than 28,000. And with the instrument testing and system check-out phases finally completed, the discoveries are only now beginning.

Beyond simply imaging these dark objects, Herschel can identify the presence of chemicals such as carbon monoxide and water based on their spectral fingerprints. “We will be able to decipher the chemistry of what's going on during the beginnings of star formation, in the discs of dust and gas that form planets, and in the lingering aftermath of stellar explosions,” Helou says.

And those are just the expected things. Who knows what *unexpected* discoveries may come from “flipping on the lights?” Helou says “we can't wait to find out.”

Herschel is a European Space Agency mission, with science instruments provided by a consortium of European-led institutes and with important participation by NASA.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Live long and Prosper…

Straight Outta Vulcan by tetsuoshima
Trekkies gotta love that one…

SEARCHING THE ASTRONET

Messier Objects

By Steven Seigel

Towards the end of March, amateur astronomers will take their telescopes and hunt the entire night looking for Messier Objects. This has become known as "The Messier Marathon."

The history of the Marathon started sometime in the 1970's by a small number of individuals here in the US and abroad, but it wasn't until 1985 that Gary Rattley from Dugas, AZ became the first person to see and record all 110 objects in one night. Rick Hull from Anza, CA duplicated Gary's success an hour later.

A more complete history can be found in this free on line book, "The Observing Guide to the Messier Marathon: A Handbook and Observing Atlas," by Don Machholz.

History of Charles Messier:

Charles Messier was a comet hunter during the late 1700's. His first edition of his catalogue of Nebulae and Star Clusters was first published as, "Memoires de l'Academie," in 1774. It was first completed in 1771. There were 45 objects. Over the course of time, the list grew to 109/110 depending on the publication you read. One of these objects may have been duplicated. The purpose of this publication was to help those in search of comets to stay away from these objects. Over the years, amateur astronomers realized how beautiful and worthwhile these objects were. They can be seen in small telescopes under dark conditions. The catalogue contains star clusters, double stars, nebulas, and galaxies. For a more complete history see http://www.astrored.net/messier (Scroll further down and you will get a complete list of the Messier objects including location and photos).

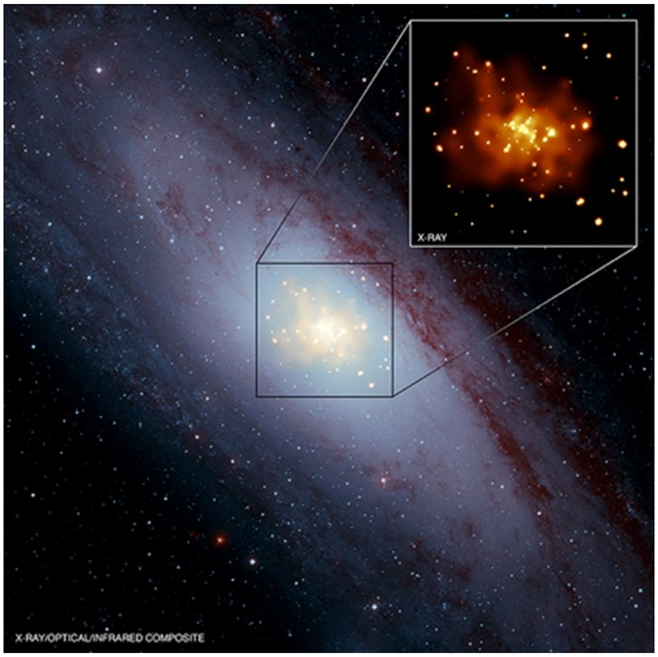
Also check out the Messier Observer Log and Order List

Please note that the best time to do a Messier Marathon this year is around March 13.

Clear Skies,
stevenseigel@hotmail.com

NASA's Chandra Reveals Origin of Key Cosmic Explosions

New findings from NASA's Chandra X-ray Observatory have provided a major advance in understanding a type of supernova critical for studying the dark energy that astronomers think pervades the universe. The results show mergers of two dense stellar remnants are the likely cause of many of the supernovae that have been used to measure the accelerated expansion of the universe.



Composite image of M31, also known as the Andromeda galaxy. Image credit: X-ray: NASA/CXC/MPA/ M.Gilfanov & A.Bogdan; Infrared: NASA/JPL-Caltech/ SSC; Optical: DSS

These supernovae, called Type 1a, serve as cosmic mile markers to measure expansion of the universe because they can be seen at large distances, and they follow a reliable pattern of brightness. However, until now, scientists have been unsure what actually causes the explosions.

"These are such critical objects in understanding the universe," said Marat Gilfanov of the Max PlanckInstitute for Astrophysics in Germany and lead author of the study that appears in the Feb. 18 edition of the journal Nature. "It was a major embarrassment that we did not know how they worked. Now we are beginning to understand what lights the fuse of these explosions."

Most scientists agree a Type 1a supernova occurs when a white dwarf star -- a collapsed remnant of an elderly star -- exceeds its weight limit, becomes unstable and explodes. Scientists have identified two main possibilities for pushing the white dwarf over the edge: two white dwarfs merging or accretion, a process in which the white dwarf pulls material from a sun-like companion star until it exceeds its weight limit.

"Our results suggest the supernovae in the galaxies we studied almost all come from two white dwarfs merging," said co-author Akos Bogdan, also of Max Planck. "This is probably not what many astronomers would expect."

The difference between these two scenarios may have implications for how these supernovae can be used as "standard candles" -- objects of a known brightness -- to track vast cosmic distances. Because white dwarfs can come in a range of masses, the merger of two could result in explosions that vary somewhat in brightness.

Because these two scenarios would generate different amounts of X-ray emission, Gilfanov and Bogdan used Chandra to observe five nearby elliptical galaxies and the central region of the Andromeda galaxy. A Type 1a supernova caused by accreting material produces significant X-ray emission prior to the explosion. A supernova from a merger of two white dwarfs, on the other hand, would create significantly less X-ray emission than the accretion scenario.

The scientists found the observed X-ray emission was a factor of 30 to 50 times smaller than expected from the accretion scenario, effectively ruling it out. This implies that white dwarf mergers dominate in these galaxies.

An open question remains whether these white dwarf mergers are the primary catalyst for Type 1a supernovae in spiral galaxies. Further studies are required to know if supernovae in spiral galaxies are caused by mergers or a mixture of the two processes. Another intriguing consequence of this result is that a pair of white dwarfs is relatively hard to spot, even with the best telescopes.

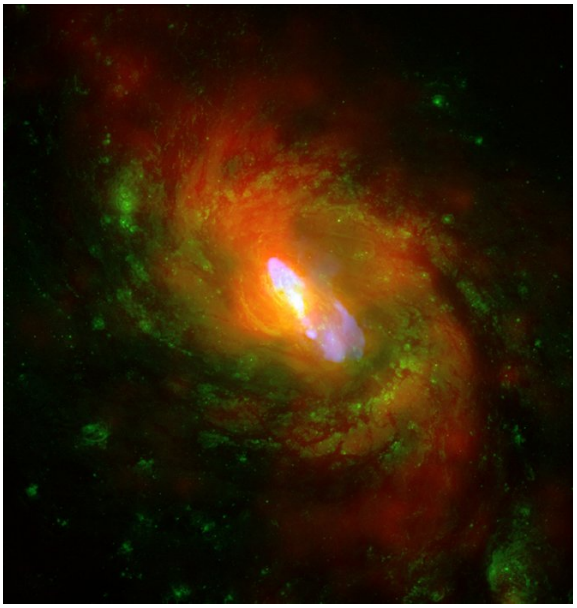
"To many astrophysicists, the merger scenario seemed to be less likely because too few double-white-dwarf systems appeared to exist," said Gilfanov. "Now this path to supernovae will have to be investigated in more detail."

In addition to the X-rays observed with Chandra, other data critical for this result came from NASA's Spitzer Space Telescope and the ground-based, infrared Two Micron All Sky Survey. The infrared brightness of the galaxies allowed the team to estimate how many supernovae should occur.

NASA's Marshall Space Flight Center in Huntsville, Ala., manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

How Black Holes May Shape Galaxies

This is a composite image of NGC 1068, one of the nearest and brightest galaxies containing a rapidly growing supermassive black hole. X-ray data from the Chandra X-ray Observatory are shown in red, optical data from the Hubble Space Telescope in green and radio data from the Very Large Array in blue. The spiral structure of NGC 1068 is shown by the X-ray and optical data, and a jet powered by the central supermassive black hole is shown by the radio data.



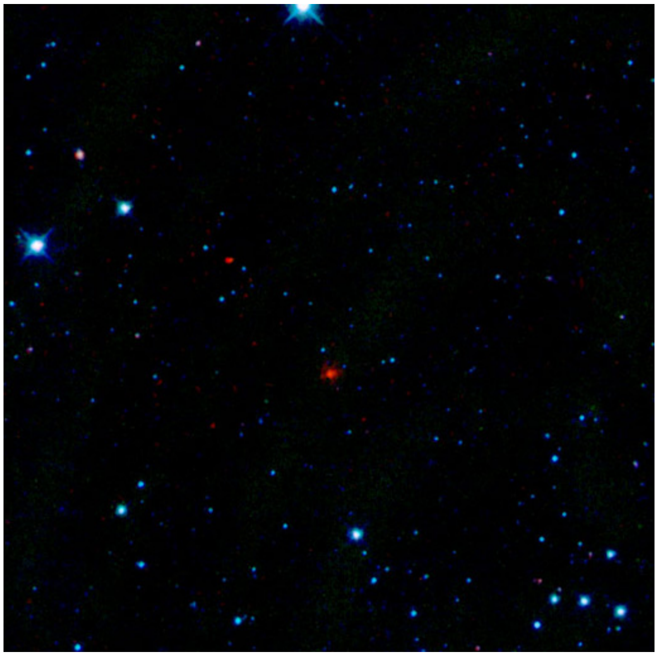
The X-ray images and spectra obtained using Chandra's High Energy Transmission Grating Spectrometer show that a strong wind is being driven away from the center of NGC 1068 at a rate of about a million miles per hour. This wind is likely generated as surrounding gas is accelerated and heated as it swirls toward the black hole. A portion of the gas is pulled into the black hole, but some of it is blown away. High energy X-rays produced by the gas near the black hole heat the ouflowing gas, causing it to glow at lower X-ray energies.

This Chandra study is much deeper than previous X-ray observations. It allowed scientists to make a high-definition map of the cone-shaped volume lit up by the black hole and its winds, and make precision measurements of how the wind speed varies along the cone. Using this data it is shown that each year several times the mass of the Sun is being deposited out to large distances, about 3,000 light years from the black hole. The wind likely carries enough energy to heat the surrounding gas and suppress extra star formation.

These results help explain how a supermassive black hole can alter the evolution of its host galaxy. It has long been suspected that material blown away from a black hole can affect its environment, but a key question has been whether such "black hole blowback" typically delivers enough power to have a significant impact.

NGC 1068 is located about 50 million light years from Earth and contains a supermassive black hole about twice as massive as the one in the middle of the Milky Way Galaxy.

WISE Spies a Comet with its Powerful Infrared Eye



The red smudge at the center of this picture is the first comet discovered by NASA's Wide-Field Infrared Survey Explorer, or WISE. Image credit: NASA/JPL-Caltech/UCLA

NASA's Wide-field Infrared Survey Explorer, or WISE, has discovered its first comet, one of many the mission is expected to find among millions of other objects during its ongoing survey of the whole sky in infrared light.

Officially named "P/2010 B2 (WISE)," but known simply as WISE, the comet is a dusty mass of ice more than 2 kilometers (1.2 miles) in diameter. It probably formed around the same time as our solar system, about 4.5 billion years ago. Comet WISE started out in the cold, dark reaches of our solar system, but after a long history of getting knocked around by the gravitational forces of Jupiter, it settled into an orbit much closer to the sun. Right now, the comet is heading away from the sun and is about 175 million kilometers (109 million miles) from Earth.

"Comets are ancient reservoirs of water. They are one of the few places besides Earth in the inner solar system where water is known to exist," said Amy Mainzer of NASA's Jet Propulsion Laboratory in Pasadena, Calif. Mainzer is the principal investigator of NEOWISE, a project to find and catalog new asteroids and comets spotted by WISE (the acronym combines WISE with NEO, the shorthand for near-Earth object).

"With WISE, we have a powerful tool to find new comets and learn more about the population as a whole. Water is necessary for life as we know it, and comets can tell us more about how much there is in our solar system."

The WISE telescope, which launched into a polar orbit around Earth on Dec. 14, 2009, is expected to discover anywhere from a few to dozens of new comets, in addition to hundreds of thousands of asteroids. Comets are harder to find than asteroids because they are much more rare in the inner solar system. Whereas asteroids tour around in the "main belt" between the orbits of Mars and Jupiter, large numbers of comets orbit farther away, in the icy outer reaches of our solar system.

Both asteroids and comets can fall into orbits that bring them close to Earth's path around the sun. Most of these "near-Earth objects" are asteroids but some are comets. WISE is expected to find new near-Earth comets, and this will give us a better idea of how threatening they might be to Earth.

"It is very unlikely that a comet will hit Earth," said James Bauer, a scientist at JPL working on the WISE project, "But, in the rare chance that one did, it could be dangerous. The new discoveries from WISE will give us more precise statistics about the probability of such an event, and how powerful an impact it might yield."

The space telescope spotted the comet during its routine scan of the sky on January 22. Sophisticated software plucked the comet out from the stream of images pouring down from space by looking for objects that move quickly relative to background stars. The comet discovery was followed up by a combination of professional and amateur astronomers using telescopes across the United States.

A teacher also teamed up with an observer to measure comet WISE using a home-built telescope next to a cornfield in Illinois. Their research is part of the International Astronomical Search Collaboration, an education program that helps teachers and students observe comets and asteroids (more information is online).

All the data are catalogued at the Minor Planet Center, in Cambridge, Mass., the worldwide clearinghouse for all observations and orbits of minor planets and comets.

Comet WISE takes 4.7 years to circle the sun, with its farthest point being about 4 astronomical units away, and its closest point being 1.6 astronomical units (near the orbit of Mars). An astronomical unit is the distance between Earth and the sun. Heat from the sun causes gas and dust to blow off the comet, resulting in a dusty coma, or shell, and a tail.

Though this particular body is actively shedding dust, WISE is also expected to find dark, dead comets. Once a comet has taken many trips around the sun, its icy components erode away, leaving only a dark, rocky core. Not much is known about these objects because they are hard to see in visible light. WISE's infrared sight should be able to pick up the feeble glow of some of these dark comets, answering questions about precisely how and where they form.

"Dead comets can be darker than coal," said Mainzer. "But in infrared light, they will pop into view. One question we want to answer with WISE is how many dead comets make up the near-Earth object population."

The mission will spend the next eight months mapping the sky one-and-a-half times. A first batch of data will be available to the public in the spring of 2011, and the final catalog a year later. Selected images and findings will be released throughout the mission.

JPL manages the Wide-field Infrared Survey Explorer for NASA's Science Mission Directorate, Washington. The principal investigator, Edward Wright, is at UCLA. The mission was competitively selected under NASA's Explorers Program managed by the Goddard Space Flight Center, Greenbelt, Md. The science instrument was built by the Space Dynamics Laboratory, Logan, Utah, and the spacecraft was built by Ball Aerospace & Technologies Corp., Boulder, Colo. Science operations and data processing take place at the Infrared Processing and Analysis Center at the California Institute of Technology in Pasadena. Caltech manages JPL for NASA. The ground-based observations are partly supported by the National Science Foundation. The Minor Planet Center is funded by NASA. More information is online at http://www.nasa.gov/wise and http://wise.astro.ucla.edu.

In the Eyepiece

Here is a list of objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
M 81 & M 82	Galaxies	Ursa Major	09h55m34.1s	+69°03'59"	7.8
NGC 3511	Galaxy	Crater	11h03m23.7s	-23°05'11"	11.5
The Spindle	Galaxy	Sextans	10h05m14.1s	-07°43'07"	10.1
Ghost of Jupiter/Eye	Planetary Nebula	Hydra	10h24m46.1s	-18°38'32"	8.6
NGC 2903	Galaxy	Leo	09h32m09.7s	+21°30'03"	9.6
M95	Galaxy	Leo	10h44m00.0s	+11°41'57"	10.5
M96	Galaxy	Leo	10h46m48.1s	+11°48'54"	10.1
The Leo I Dwarf	Galaxy	Leo	10h08m30.6s	+12°18'07"	11.2
Markarian 421	Galaxy	Ursa Major	11h04m27.4s	+38°12'34"	14.8
Arp 270	Galaxy Pair	Leo Minor	10h49m52.4s	+32°58'35"	12.4
NGC 2818	Planetary Nebula in Open Cluster	Pyxis	09h16m01.5s	-36°36'37"	13.0
The Twin Quasar	Quasar	Ursa Major	10h01m20.8s	+55°53'54"	17.0
Hickson 44	Galaxy Group	Leo	10h18m00.4s	+21°48'44"	10.0
Abell 33	Planetary Nebula	Hydra	09h39m09.2s	-02°48'35"	13.4

Coordinates are epoch 2000.0

March 2010 Celestial Events: supplied by J. Randolph Walton (Randy)

Day	Date	Time (EDT)	Event
Wed	3	After 19:20	**Zodiacal Light** visible in W after evening twilight for next two weeks
Sat	6	00:14	Moon Rise
		04:45	Mars Sets
		06:20	Mercury Rises
		06:20	Jupiter Rises
		06:26	Sunrise
		17:57	Sunset
		19:00	Venus Sets
		19:05	Saturn Rises
Sun	7	10:25	Moon Set
		10:42	**Last Quarter Moon**
Sat	13	04:20	Mars Sets
		06:00	Jupiter Rises
		06:15	Sunrise
		16:16	Moon Set
		18:05	Sunset
		18:40	Saturn Rises
		19:15	Venus Sets
Sun	14	02:00	**Daylight Saving Time begins**
Mon	15	17:01	**New Moon**
		19:14	Moon Set
Sat	20	04:53	Mars Sets
		06:32	Jupiter Rises
		07:04	Sunrise
		09:08	Moon Rise
		13:32	**Spring Equinox**
		19:10	Saturn Rises
		19:12	Sunset
		19:40	Mercury Sets
		20:00	Moon 0.3 deg. S of Pleiades (M45)
		20:30	Venus Sets
Tue	23	07:00	**First Quarter Moon**
		11)51	Moon Rise
		19:00	**Lunar Straight Wall visible**
Sat	27	04:30	Mars Sets
		06:07	Jupiter Rises
		06:52	Sunrise
		07:00	Saturn Sets
		16:47	Moon Rise
		19:19	Sunset
		20:25	Mercury Sets
		20:50	Venus Sets
Mon	29	19:16	Moon Rise
		22:25	**Full Moon**
Fri	**Apr 2**	After 20:15	**Zodiacal Light** visible in W after evening twilight for next two weeks
Sun	**Apr 4**	05:45	Jupiter Rises
		06:39	Sunrise
		07:28	Double-shadow transit on Jupiter