November 2009

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

November's Meeting

The next meeting of S*T*A*R will be on Thursday, November 5, 2009. Our program will be ***"The Discovery of Cosmic Microwave Background Radiation and its Role in Cosmology"*** with guest speaker, Nobel Prize Recipient Dr. Robert Wilson. All are welcome. The meeting will begin promptly at 8:00pm at the Student Life Center on the Brookdale Community College campus.

Editor's Corner

Many thanks to Dave Nelson, & 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

December Issue

Please submit articles and contributions for the next *Spectrogram* by November 25. Please email to fowler@verizon.net.

Calendar

- Nov 5, 2009 - ***"The Discovery of Cosmic Microwave Background Radiation and its Role in Cosmology "*** by Dr. Robert Wilson.
- Nov 24, 2009 Star Party at the Mill Lake Elementary School in Monroe Township.
- Dec 3, 2009 – ***"Meteorites"*** by Derek Yost.
- Dec 4, 2009 – Annual Bayonet Farms Star Party.
- Jan 7, 2010 - TBA
- Feb 4, 2010 – ATM Night!
- Mar 4, 2010 - TBA
- Apr 1, 2010 - TBA
- May 6, 2010 - TBA
- 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 us know what you've got!

October Meeting Minutes

By Steve Fedor

The October 1st, 2009 meeting of S*T*A*R Astronomy Club began at 8:05 pm. There were 38 members and non-members in attendance. President Nancy McQuire chaired the meeting and began by welcoming three first time attendees and announcing that the scheduled speaker had cancelled. Luckily STAR's own Dave Britz came to our rescue.

Beginning at 8:11 Dave Britz presented a fascinating talk on the methods of grinding mirrors, lenses and general optical principles. Dave's talk included many topics regarding the basic laws of reflection, refraction and also the chemistry of glass itself. The talk concluded at 9:21.

Frank Loso then presented "Object of the Month." This month's objects were Herschell's Garnett Star, one of the reddest starts viewable. The challenge object was IC-1396 which Herschell's Garnett Star is in. Frank also mentioned that Mars will be in the Beehive cluster.

It was also noted that Frank will not be doing "Object of the Month" regularly and other members are encouraged to volunteer occasionally. Nancy also indicated the need for speakers.

Dennis O'Leary then presented the NASA update. Dennis discussed the Messenger flyby of Mercury, the LCROSS impact crater and the Mars reconnaissance orbiter. Afterwards the meeting broke for coffee.

Announcements:
Steve Seigel announced he needs help with a star party at the Watchung Reservation on Nov.13 (rain date Nov. 20th). For more information contact him at stevenseigel@hotmail.com.

Randy Walton announced a group purchase of observers handbooks and calendar through ASTRA. He also indicated there was free literature available at the meeting.

Dennis O'Leary announced he needs help with a star party at the Mill Lake School in Monroe Township.

Nancy & Dennis announced there was no progress on using Dorbrook Park as a possible local observing site.

The 50/50 was drawn. Meeting was adjourned.

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_____

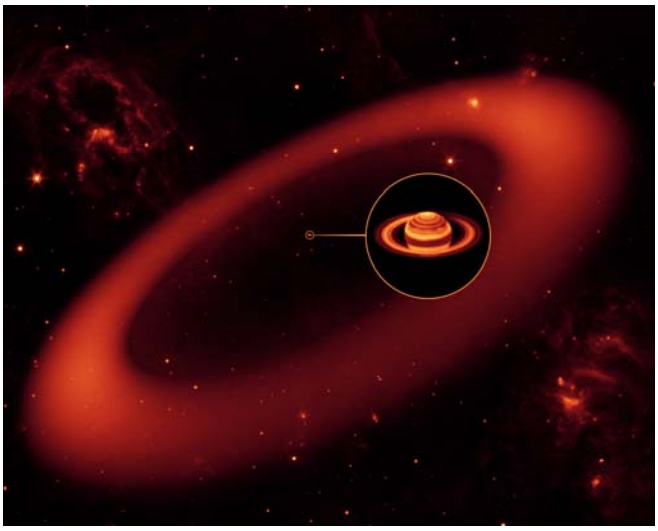
City_____State___Zip_____

Phone_____

Email_____

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

NASA Space Telescope Discovers Largest Ring Around Saturn



This artist's conception shows a nearly invisible ring around Saturn — the largest of the giant planet's many rings. It was discovered by NASA's Spitzer Space Telescope. Image credit: NASA/JPL-Caltech/Keck

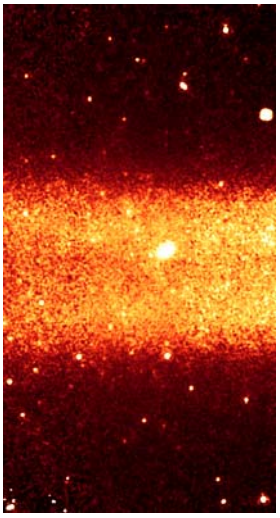
PASADENA, Calif. -- NASA's Spitzer Space Telescope has discovered an enormous ring around Saturn -- by far the largest of the giant planet's many rings.

The new belt lies at the far reaches of the Saturnian system, with an orbit tilted 27 degrees from the main ring plane. The bulk of its material starts about six million kilometers (3.7 million miles) away from the planet and extends outward roughly another 12 million kilometers (7.4 million miles). One of Saturn's farthest moons, Phoebe, circles within the newfound ring, and is likely the source of its material.

Saturn's newest halo is thick, too -- its vertical height is about 20 times the diameter of the planet. It would take about one billion Earths stacked together to fill the ring.

"This is one supersized ring," said Anne Verbiscer, an astronomer at the University of Virginia, Charlottesville. "If you could see the ring, it would span the width of two full moons' worth of sky, one on either side of Saturn." Verbiscer; Douglas Hamilton of the University of Maryland, College Park; and Michael Skrutskie, of the University of Virginia, Charlottesville, are authors of a paper about the discovery published online by the journal Nature.

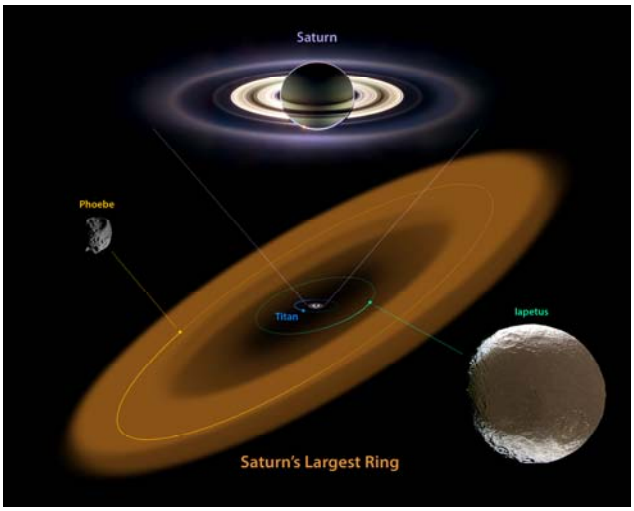
The ring itself is tenuous, made up of a thin array of ice and dust particles. Spitzer's infrared eyes were able to spot the glow of the band's cool dust. The telescope, launched in 2003, is currently 107 million kilometers (66 million miles) from Earth in orbit around the sun.



This picture shows a slice of Saturn's largest ring, as seen in infrared light by NASA's Spitzer Space Telescope. Image credit: NASA/JPL-Caltech/Univ. of Virginia

The discovery may help solve an age-old riddle of one of Saturn's moons. Iapetus has a strange appearance -- one side is bright and the other is really dark, in a pattern that resembles the yin-yang symbol. The astronomer Giovanni Cassini first spotted the moon in 1671, and years later figured out it has a dark side, now named Cassini Regio in his honor. A stunning picture of Iapetus taken by NASA's Cassini spacecraft is online at http://photojournal.jpl.nasa.gov/catalog/PIA08384 .

Saturn's newest addition could explain how Cassini Regio came to be. The ring is circling in the same direction as Phoebe, while Iapetus, the other rings and most of Saturn's moons are all going the opposite way. According to the scientists, some of the dark and dusty material from the outer ring moves inward toward Iapetus, slamming the icy moon like bugs on a windshield.



This diagram illustrates the extent of the largest ring around Saturn, discovered by NASA's Spitzer Space Telescope. The ring is huge, and far from the gas planet and the rest of its majestic rings. Image credit: NASA/JPL-Caltech

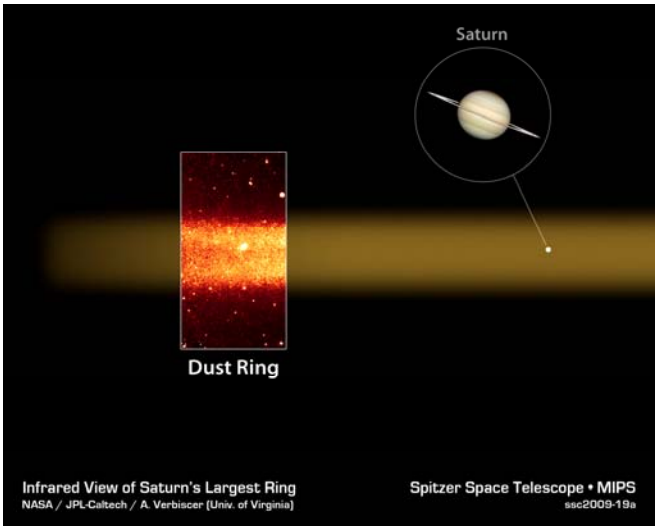
"Astronomers have long suspected that there is a connection between Saturn's outer moon Phoebe and the dark material on Iapetus," said Hamilton. "This new ring provides convincing evidence of that relationship."

The ring would be difficult to see with visible-light telescopes. Its particles are diffuse and may even extend beyond the bulk of the ring material all the way in to Saturn and all the way out to interplanetary space. The relatively small numbers of particles in the ring wouldn't reflect much visible light, especially out at Saturn where sunlight is weak.

"The particles are so far apart that if you were to stand in the ring, you wouldn't even know it," said Verbiscer.

Spitzer was able to sense the glow of the cool dust, which is only about 80 Kelvin (minus 316 degrees Fahrenheit). Cool objects shine with infrared, or thermal radiation; for example, even a cup of ice cream is blazing with infrared light. "By focusing on the glow of the ring's cool dust, Spitzer made it easy to find," said Verbiscer.

These observations were made before Spitzer ran out of coolant in May and began its "warm" mission.



This diagram highlights a slice of Saturn's largest ring. The ring (red band in inset photo) was discovered by NASA's Spitzer Space Telescope, which detected infrared light, or heat, from the dusty ring material. Spitzer viewed the ring edge-on from its Earth-trailing orbit around the sun. Hubble image credit: NASA/ESA/STScI/AURA

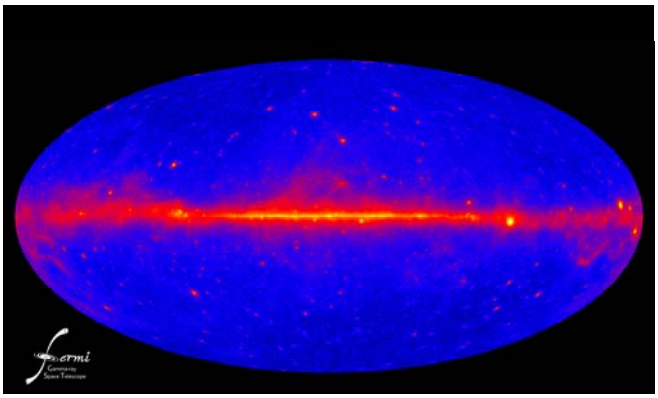
NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology, also in Pasadena. Caltech manages JPL for NASA. The multiband imaging photometer for Spitzer was built by Ball Aerospace Corporation, Boulder, Colo., and the University of Arizona, Tucson. Its principal investigator is George Rieke of the University of Arizona.

For additional images relating to the ring discovery and more information about Spitzer, visit the web sites www.nasa.gov/spitzer and www.spitzer.caltech.edu/spitzer.

Fermi Telescope Caps First Year With Glimpse of Space-Time

Goddard Space Flight Center - During its first year of operations, NASA's Fermi Gamma Ray Space Telescope mapped the extreme sky with unprecedented resolution and sensitivity.

It captured more than 1,000 discrete sources of gamma rays -- the highest-energy form of light. Capping these achievements was a measurement that provided rare experimental evidence about the very structure of space and time, unified as space-time in Einstein's theories.



This view of the gamma-ray sky constructed from one year of Fermi LAT observations is the best view of the extreme universe to date. The map shows the rate at which the LAT detects gamma rays with energies above 300 million electron volts -- about 120 million times the energy of visible light -- from different sky directions. Brighter colors equal higher rates.
Credit: NASA/DOE/Fermi LAT Collaboration

"Physicists would like to replace Einstein's vision of gravity -- as expressed in his relativity theories -- with something that handles all fundamental forces," said Peter Michelson, principal investigator of Fermi's Large Area Telescope, or LAT, at Stanford University in Palo Alto, Calif. "There are many ideas, but few ways to test them."

Many approaches to new theories of gravity picture space-time as having a shifting, frothy structure at physical scales trillions of times smaller than an electron. Some models predict that the foamy aspect of space-time will cause higher-energy gamma rays to move slightly more slowly than photons at lower energy.

Such a model would violate Einstein's edict that all electromagnetic radiation -- radio waves, infrared, visible light, X-rays and gamma rays -- travels through a vacuum at the same speed.
On May 10, 2009, Fermi and other satellites detected a so-called short gamma ray burst, designated GRB 090510. Astronomers think this type of explosion happens when neutron stars collide. Ground-based studies show the event took place in a galaxy 7.3 billion light-years away. Of the many gamma ray photons Fermi's LAT detected from the 2.1-second burst, two possessed energies differing by a million times. Yet after traveling some seven billion years, the pair arrived just nine-tenths of a second apart.

"This measurement eliminates any approach to a new theory of gravity that predicts a strong energy dependent change in the speed of light," Michelson said. "To one part in 100 million billion, these two photons traveled at the same speed. Einstein still rules."

Fermi's secondary instrument, the Gamma ray Burst Monitor, has observed low-energy gamma rays from more than 250 bursts. The LAT observed 12 of these bursts at higher energy, revealing three record setting blasts.

GRB 090510 displayed the fastest observed motions, with ejected matter moving at 99.99995 percent of light speed. The highest energy gamma ray yet seen from a burst -- 33.4 billion electron volts or about 13 billion times the energy of visible light -- came from September's GRB 090902B. Last year's GRB 080916C produced the greatest total energy, equivalent to 9,000 typical supernovae.

Scanning the entire sky every three hours, the LAT is giving Fermi scientists an increasingly detailed look at the extreme universe. "We've discovered more than a thousand persistent gamma ray sources -- five times the number previously known," said project scientist Julie McEnery at NASA's Goddard Space Flight Center in Greenbelt, Md. "And we've associated nearly half of them with objects known at other wavelengths."

Blazars -- distant galaxies whose massive black holes emit fast-moving jets of matter toward us -- are by far the most prevalent source, now numbering more than 500. In our own galaxy, gamma ray sources include 46 pulsars and two binary systems where a neutron star rapidly orbits a hot, young star.

"The Fermi team did a great job commissioning the spacecraft and starting its science observations," said Jon Morse, Astrophysics Division director at NASA Headquarters in Washington. "And now Fermi is more than fulfilling its unique scientific promise for making novel, high-impact discoveries about the extreme universe and the fabric of space-time."

NASA's Fermi Gamma Ray Space Telescope is an astrophysics and particle physics partnership, developed in collaboration with the U.S. Department of Energy, along with important contributions from academic institutions and partners in France, Germany, Italy, Japan, Sweden and the United States.

STS-129: Stocking the Station

For the mission patch of STS-129, the sun shines brightly on the International Space Station above and the United States below representing the bright future of U.S. human spaceflight. Image: NASA

NASA - The spare parts delivered to the International Space Station by Atlantis during the STS-129 mission will mean spare years on the station's life once the space shuttle fleet is retired.

"You'll see this theme in some of the flights that are going to come after ours as well," said Brian Smith, the lead space station flight director for the mission. "This flight is all about spares – basically, we're getting them up there while we still can."

With only one U.S. module left to deliver, the Space Shuttle Program is turning its attention to helping the space station build up a store of replacement parts. There are only half a dozen flights left in the shuttle's manifest before they stop

flying, and as the only vehicle large enough to carry many of the big pieces of equipment into space, several of the flights are devoted to the task. This is the first, however, and as the first this mission is dedicated to taking up the spares of the highest priority.

"We're taking the big ones," Smith said. "And not only are they the big ones – they're the ones deemed most critical. That's why they're going up first."

The spares are going up on two platforms – called external logistics carriers, or ELCs – to be attached on either side of the station's truss, in hopes that wherever a failure happens, the necessary spare won't be too far away. The ELCs carried up on STS-129 will be chocked full with two pump modules, two control moment gyroscopes, two nitrogen tank assemblies, an ammonia tank assembly, a high-pressure gas tank, a latching end effector for the station's robotic arm and a trailing umbilical system reel assembly for the railroad cart that allows the arm to move along the station's truss system. There's also a power control unit, a plasma container unit, a cargo transportation container and a battery charge/discharge unit. In all, that's 27,250 pounds worth of spares to keep the station going long after the shuttles retire.

Some of those spares would be used to replace failed components of the systems that provide the station power or keep it from overheating or tumbling through space. Others, in the case of the latching end effector and reel assembly, are essential parts of the robotics system that allow the astronauts to replace the other parts when they wear out.

"It was a long-term goal to have the full power production capability and all the international partners present and six person crew capability," said Mike Sarafin, the lead shuttle flight director for the mission. "These are the spares that will allow us to utilize the investment that we've put in."

NASA isn't nearly done investing in the station, however, and the agenda of Atlantis' crew makes that clear. In addition to the complex robotics work required to get the spares into place, there are three spacewalks scheduled to go on outside and a complicated rewiring project planned for the crew inside.

The focus for the work inside, and object of several tasks inside, will be preparing for the STS-130 mission, during which the last U.S. space station module will be delivered: the Tranquility node with its attached cupola. During the spacewalks, that will mean routing connections and preparing the berthing port on the Harmony node that it will attach to. On the inside, the work is a little more extensive. Originally, Tranquility was to be installed on the Earth-facing port of the Harmony node, but it's since been decided that it would fit better on the port side of Harmony. And changing the plans requires significant changes to the hardware. Data, power, cooling lines, air flow – all of those connections need to be rerouted to the new location, and with double the manpower normally available at the station, a shuttle mission is a good time to get that done.

However, even with the shuttle crew at the station, resources aren't unlimited. Any mission would consider its plate pretty full, with the robotics work required to get the spares transferred to the station, the spacewalks and the Tranquility prep work inside. But unlike the other space shuttles, Atlantis wasn't outfitted with the system that allows shuttles to draw power from the space station. That means that where recent station assembly missions have lasted up to 17 days, Atlantis has only 11 to get to the station and back.

"All that in 11 days," Sarafin said. "It's a lot to package into a finite period of time; it's a challenging mission."

Still, the STS-129 team intends to make the most of every second it has on orbit, just as the larger shuttle and station teams will make the most of each of the remaining missions. That's not unusual, though – Atlantis' Commander Charles O. Hobaugh would say that it's characteristic of the entire effort that has gone into building the station.

On the front row are Commander Charlie Hobaugh (left) and Pilot Barry Wilmore. On the back row (from left) are astronauts Leland Melvin, Mike Foreman, Robert Satcher and Randy Bresnik, all mission specialists. Image credit: NASA

"There's been a lot of work put forth to make it all successful, and it's just incredible to see how much has been accomplished and how successful it has become," he said. "The space station has been a long hard road, but it's been an extremely productive road. We've really been able to bring together a diverse national and international background of cultures for one common cause. It's all science and exploration and cooperation."

In the Eyepiece

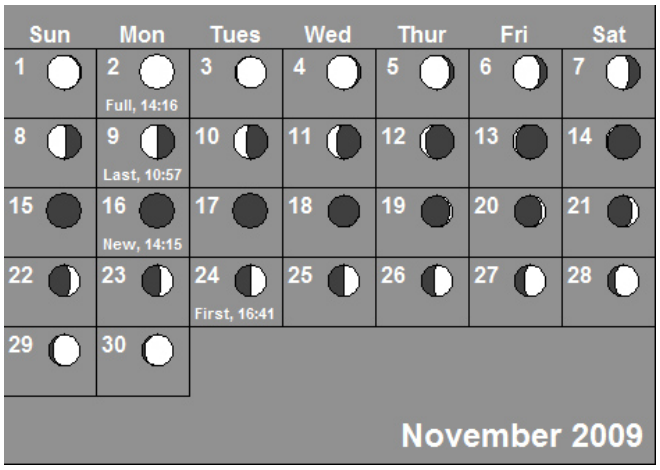
Here is a list of objects for this month. This is reproduced from www.skyhound.com with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
Iota Cas	Multiple Star	Cassiopeia	02h29m04.0s	+67°24'09"	4.5
6 Tri	Multiple Star	Triangulum	02h12m22.3s	+30°18'11"	4.9
Almaak	Multiple Star	Andromeda	02h03m53.9s	+42°19'47"	2.1
h and Chi Perseus	Open Clusters	Perseus	02h19m01.8s	+57°08'47"	4.3
NGC 1097	Galaxy	Fornax	02h46m18.9s	-30°16'21"	10.2
M 103	Open Cluster	Cassiopeia	01h33m13.8s	+60°42'23"	6.9
Little Dumbbell (M76)	Planetary Nebula	Perseus	01h42m19.3s	+51°34'30"	12.2
NGC 891	Galaxy	Andromeda	02h22m32.9s	+42°20'46"	10.8
NGC 1023	Galaxy	Perseus	02h40m27.7s	+39°04'04"	10.2
AGC 347	Galaxy Group	Andromeda	02h25m48.0s	+41°52'00"	--
IC 1747	Planetary Nebula	Cassiopeia	01h57m35.8s	+63°19'19"	13.6
NGC 470 & 474	Interacting Galaxy Pair	Pisces	01h19m44.9s	+03°24'35"	12.6
NGC 925	Galaxy	Triangulum	02h27m16.8s	+33°34'45"	10.9
NGC 784	Galaxy	Triangulum	02h01m16.8s	+28°50'14"	12.5

Coordinates are epoch 2000.0

Guides and Calendars

Lunar Phases

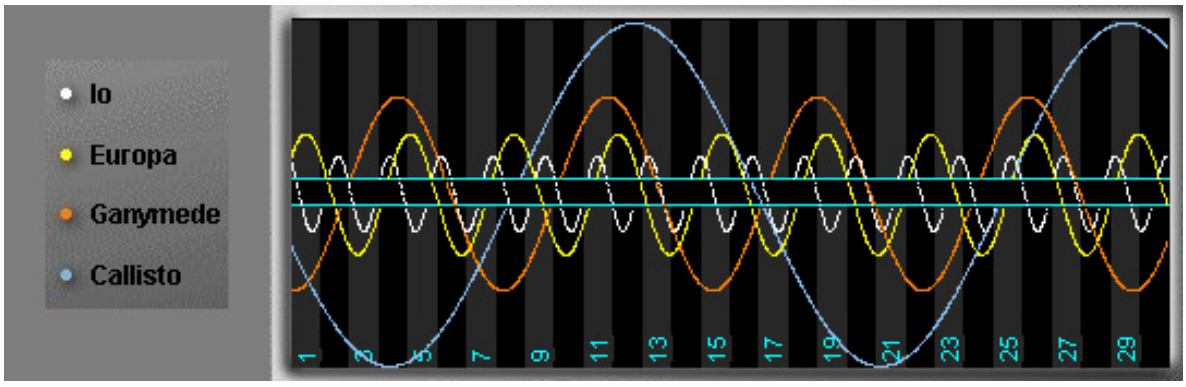


GREAT RED SPOT TRANSIT TIMES

1	08:30;	18:26;	
2	04:22;	14:18;	
3	00:14;	10:09;	20:05;
4	06:01;	15:57;	
5	01:52;	11:48;	21:44;
6	07:40;	17:35;	
7	03:31;	13:27;	23:23;
8	09:19;	19:14;	
9	05:10;	15:06;	
10	01:02;	10:58;	20:53;
11	06:49;	16:45;	
12	02:41;	12:37;	22:32;
13	08:28;	18:24;	
14	04:20;	14:15;	
15	00:11;	10:07;	20:03;
16	05:59;	15:54;	
17	01:50;	11:46;	21:42;
18	07:38;	17:33;	
19	03:29;	13:25;	23:21;
20	09:17;	19:13;	
21	05:09;	15:04;	
22	01:00;	10:56;	20:52;
23	06:48;	16:43;	
24	02:39;	12:35;	22:31;
25	08:27;	18:22;	
26	04:18;	14:14;	
27	00:10;	10:06;	20:01;
28	05:57;	15:53;	
29	01:49;	11:45;	21:40;
30	07:37;	17:32;	

Jupiter Moon Calendar

Here is a graphical depiction of the visible moons of Jupiter for the month of September 2009.



November 2009 Celestial Events

supplied by J. Randolph Walton (Randy)

Day	Date	Time (EDT)	Event
Sun	1	02:00	Daylight Saving Time ends
Mon	2	14:14	**Full Moon**
		16:32	Moon Rise
Thu	5	05:00	S. Taurid meteors (ZHR=15)
Sat	7	02:45	Saturn Rises
		05:15	Venus Rises
		06:36	Sunrise
		16:51	Sunset
		21:25	Moon Rise
		22:30	Mars Rises
		23:20	Jupiter Sets
Mon	9	10:56	**Last Quarter Moon**
		12:50	Moon Set
Thu	12	05:00	N. Taurid meteors (ZHR=15)
Sat	14	02:25	Saturn Rises
		04:29	Moon Rise
		05:30	Venus Rises
		06:44	Sunrise
		16:44	Sunset
		22:15	Mars Rises
		22:55	Jupiter Sets
Mon	16	14:14	**New Moon**
		16:19	Moon Set
Tue	17	11:00	Leonid meteors (ZHR=15)
Sat	21	02:05	Saturn Rises
		05:50	Venus Rises
		06:52	Sunrise
		16:39	Sunset
		17:05	Mercury Sets
		20:50	Moon Set
		22:00	Mars Rises
		22:35	Jupiter Sets
Tue	24	16:39	**First Quarter Moon**
		23:50	Moon Set
Sat	28	01:40	Saturn Rises
		06:05	Venus Rises
		07:00	Sunrise
		13:55	Moon Rise
		16:36	Sunset
		17:15	Mercury Sets
		21:40	Mars Rises
		22:10	Jupiter Sets
Wed	**Dec 2**	02:30	**Full Moon**
		07:34	Moon Set