

# *D I S T A N T* *L I G H T*

Rockland Astronomy Club Journal ~ June 2007

## CHANDRA SPIES LARGEST SUPERNOVA

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FOR VIEWING**

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International Dark Sky Association



**OUR ADDRESS IS:**  
Rockland Astronomy Club,  
225 Route 59, Suffern, NY 10901-5203

**WHO WE ARE:**  
Rockland Astronomy Club is a non-profit organization founded in 1958. We are dedicated to expanding public awareness of the Universe and to furthering an appreciation of astronomy and space science education. In 2005 the Rockland Astronomy Club received the prestigious PRIDE OF ROCKLAND award for our on-going community involvement and pursuit of our mission.

**CLUB EVENT**

**Jupiter Opposition Party**

Join the Rockland Astronomy Club at SUNY Rockland Community College on Tuesday June 19th for a Free Public Event.

Jupiter will be at opposition in June which brings it closer to Earth than at any other time of year. With Jupiter big and bright, don't miss this perfect opportunity for viewing this majestic giant and all it's fascinating phenomena. On June 19th, Io, one of many moons of Jupiter, will be visible transiting in front of Jupiter along with its shadow cast upon the planet. Additionally the Great Red Spot will be clearly visible during the evening.

So join us at the observing field, south of the main Field



House at SUNY Rockland Community College. There'll be plenty of snacks and refreshments, so bring the family for a fun filled evening of exploration.

Viewing begins from 9:00pm until midnight, Tuesday June 19th 2007.

Call our hotline for last minute weather updates: 1-845-47STARS

For additional information and directions visit our web site: [www.RocklandAstronomy.com](http://www.RocklandAstronomy.com)

**RAC MEMBERSHIP APPLICATION**

Club members receive this journal, enjoy special prices for annual subscriptions to S&T and ASTRONOMY magazines, discounts to club events and much more. Make checks payable to RAC and mail with this form to: Rockland Astronomy Club, Attn: Memberships, 225 Route 59, Suffern, New York 10901-5203.

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COVER STORY

# NASA's Chandra Sees Brightest Supernova Ever

NASA-  
Press Release 07-102

WASHINGTON - The brightest stellar explosion ever recorded may be a long-sought new type of supernova, according to observations by NASA's Chandra X-ray Observatory and ground-based optical telescopes. This discovery indicates that violent explosions of extremely massive stars were relatively common in the early universe, and that a similar explosion may be ready to go off in our own galaxy.

"This was a truly monstrous explosion, a hundred times more energetic than a typical supernova," said Nathan Smith of the University of California at Berkeley, who led a team of astronomers from California and the University of Texas in Austin. "That means the star that exploded might have been as massive as a star can get, about 150 times that of our sun. We've never seen that before."

Astronomers think many of the first generation of stars were this massive, and this new supernova may thus provide a rare glimpse of how the first stars died. It is unprecedented, however, to find such a massive star and witness its death. The discovery of the supernova, known as SN 2006gy, provides evidence that the death of such massive stars is fundamentally different from theoretical predictions.

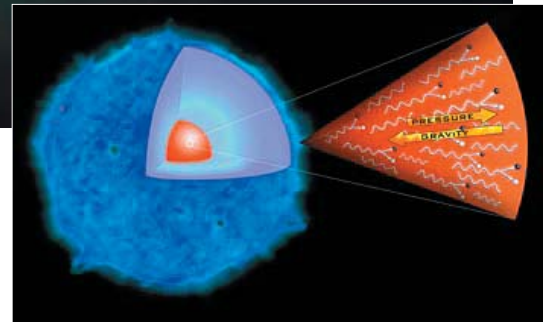
"Of all exploding stars ever observed, this was the king," said Alex

*Above: Infrared image of SN 2006gy and the nucleus of NGC 1260 (left) obtained by UC Berkley astronomers. Right: Gamma-radiation is converted into particle pairs causing the star to collapse under its own weight.*

Filippenko, leader of the ground-based observations at the Lick Observatory at Mt. Hamilton, Calif., and the Keck Observatory in Mauna Kea, Hawaii. "We were astonished to see how bright it got, and how long it lasted."

**Astronomers think many of the first generation of stars were this massive, and this new supernova may thus provide a rare glimpse of how the first stars died.**

The Chandra observation allowed the team to rule out the most likely alternative explanation for the supernova: that a white dwarf star with a mass only slightly higher than the sun exploded into a dense, hydrogen-rich environment. In that event, SN 2006gy should have been 1,000 times brighter in X-rays than what Chandra detected.



"This provides strong evidence that SN 2006gy was, in fact, the death of an extremely massive star," said Dave Pooley of the University of California at Berkeley, who led the Chandra observations.

The star that produced SN 2006gy apparently expelled a large amount of mass prior to exploding. This large mass loss is similar to that seen from Eta Carinae, a massive star in our galaxy, raising suspicion that Eta Carinae may be poised to explode as a supernova. Although SN 2006gy is intrinsically the brightest supernova ever, it is in the galaxy NGC 1260, some 240 million light years away. However, Eta Carinae is only about 7,500 light years away in our own Milky Way galaxy.

"We don't know for sure if Eta Carinae will explode soon, but we had better keep a close eye on it just in case," said Mario Livio of the Space Telescope Science Institute in Baltimore, who was not involved in the research. "Eta Carinae's explosion could be the best star-show in the history of modern civilization." ★

THE LEARN MORE SERIES

# Learn More About Jupiter

Jupiter is prime for viewing this June, but how much do you really know about our largest planet?

Reprinted from the Rockland Astronomy Club's *Learn More Series*.

Jupiter is the fifth planet from the Sun and is the largest one in the solar system. Jupiter is so large that more than one thousand Earths could fit inside. It also contains more matter than all of the other planets combined. At last count, Jupiter has over 40 known



Spot is a complex storm moving in a counter-clockwise direction. At the outer edge, material appears to rotate in four to six days. An array of other smaller storms and eddies can be found through out the banded clouds.

On occasion two moons may transit at the same time making for an especially interesting event.

## DID YOU KNOW?

Like Saturn, Jupiter also has rings!



*Jupiter's moon Io along with its shadow, transit across the face of the planet.*

satellites, four of which - Callisto, Europa, Ganymede and Io - were observed by Galileo as long ago as 1610. Jupiter's atmosphere comprises mainly the entire planet, and is somewhat like the Sun. It is composed mainly of hydrogen and helium and there is some speculation that it is in fact a failed sun.

Colorful latitudinal bands, atmospheric clouds and storms illustrate Jupiter's dynamic weather systems. The cloud patterns change within hours or days. The Great Red

## OCCULTATIONS AND TRANSITS

Jupiter's four largest moons, Io, Europa, Ganymede, and Callisto, are often occulted by Jupiter. These events can be seen in a telescope and are interesting to watch as the moons pass behind the planet.

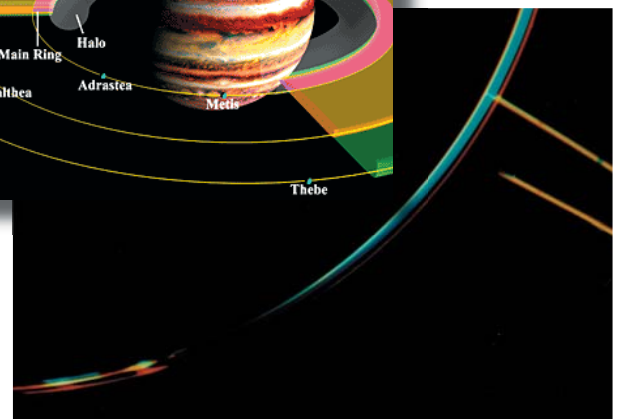
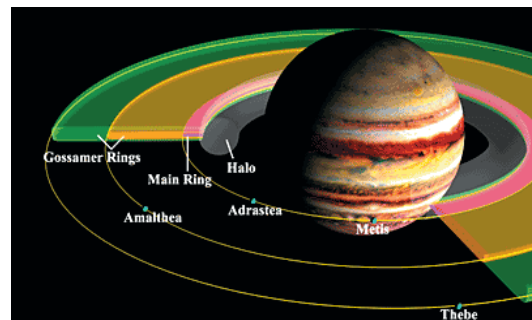
Just as the moons can be occulted, they are often seen in transit across the face of Jupiter. A transit is also accompanied by a transit of the shadow produced by the moon. The dark spot of the shadow on Jupiter is easy to see, but as the moon itself transits different clouds, its visibility can change, making the challenge to see the moon throughout the transit, not the dark spot of its shadow.

However, unlike Saturn's intricate and complex ring patterns, Jupiter has a simple ring system that is composed of an inner halo, a main ring and a Gossamer ring.

The rings were discovered in 1979 by the Voyager 1 space probe.

The rings are very tenuous and are not visible from Earth. They and are composed of dust particles kicked up as interplanetary meteoroids smash into Jupiter's four small inner moons Metis, Adrastea, Thebe, and Amalthea.

Many of the particles are microscopic in size. ★





Last Qtr June 7    New June 15    First Qtr June 22    Full June 29

# JUNE SKYDATA

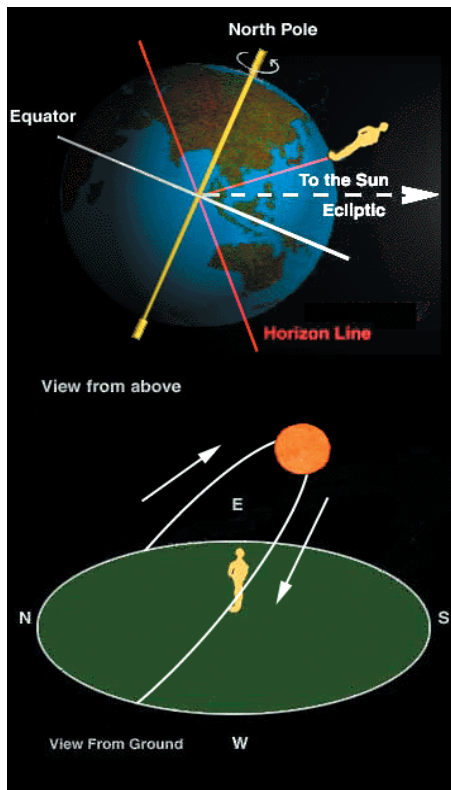
## Highlights

- June 2 Mercury at greatest eastern elongation (23°)
- June 5 Jupiter at opposition
- June 8 Venus at greatest eastern elongation
- June 10 Mars 5° south of Moon
- June 15 Mercury stationary
- June 16 Mercury 6° south of Moon
- June 18 Venus 0.6° south of Moon
- June 19 Saturn 0.4° south of Moon
- June 21 Summer Solstice 2:06 P.M.
- June 28 Antares 0.5° north of Moon
- June 28 Mercury in inferior conjunction

## The Summer Solstice

By Angela Yanette

“Solstice” is derived from two Latin words: “sol” meaning sun, and “sistere,” to cause to stand still. This is because, as the summer solstice approaches, the noonday sun rises higher and higher in the sky on each successive day. On



the day of the solstice, it rises an imperceptible amount, compared to the day before, i.e., its noontime elevation does not seem to change from day to day.

In this sense, it “stands still.”

At the Summer Solstice, the sun is located at the Tropic of Cancer and its apparent position on the celestial sphere reaches its greatest distance above the celestial equator, about 23 1/2° of arc or about 74° altitude which is the highest point in the sky that it will reach in our latitude

In the Northern Hemisphere the longest day and shortest night of the year occur on this date, marking the beginning of summer.

The upper diagram shows the view from the solar system on the summer solstice, the northern half of the Earth is tilted towards the Sun. It has been getting higher and higher in the sky since the winter solstice and through the vernal equinox. This means that in general, the northern hemisphere is getting more direct sunlight, which heats the Earth most efficiently, than the southern hemisphere. This is summer for us in the northern hemisphere and during the summer, the Sun is also above the horizon longer than it is during the winter. The summer solstice is the longest day of the year. The lower diagram shows the view on the surface of the earth.

At the same time, the southern half of the Earth is tilted away from the Sun. If you were living in Argentina (roughly opposite New York in the southern latitude) you would be bundled up for the winter.

The Summer Solstice has traditionally  
*(Continued on next page)*

## Prime Observing Window

Sunday June 10 through Tuesday June 19

## Sun & Moon Rise & Set Times

Date	Sunrise	Set	Moonrise	Set	Phase
June 7	05:24	20:27	00:49	11:50	Last Qtr
June 15	05:23	20:31	5:20	21:41	New
June 22	05:24	20:33	13:12	00:41	First Qtr
June 29	05:26	20:33	20:23	04:03	Full

## Planetary

### Visible Planets in the Night Sky

#### June 1

	Rise	Transit	Set	Mag
Mercury	06:55	14:35	22:16	0.5
Venus	08:38	16:11	23:44	-4.3
Mars	02:52	09:07	15:23	0.8
Jupiter	20:32	13:14	05:57	-2.6
Saturn	10:46	05:48	00:51	0.5

#### June 15

	Rise	Transit	Set	Mag
Mercury	06:47	14:11	21:35	2.3
Venus	08:55	16:11	23:28	-4.3
Mars	02:21	08:50	15:20	0.8
Jupiter	19:29	12:12	04:55	-2.6
Saturn	09:57	16:56	23:55	0.5

#### June 30

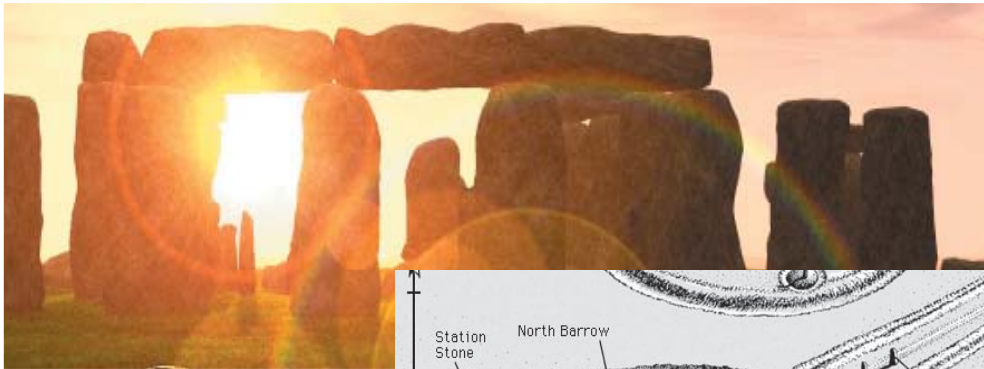
	Rise	Transit	Set	Mag
Mercury	05:36	12:46	19:57	4.8
Venus	09:03	15:59	22:56	-4.4
Mars	01:49	08:33	15:17	0.7
Jupiter	18:22	11:05	03:49	-2.5
Saturn	09:05	16:02	23:00	0.6

## SUMMER SOLSTICE

*(Continued from previous page)*

marked a day of celebration in ancient times and many of those traditions still carry into modern times. But why was there such a fascination with the summer solstice? To ancient

be illuminated by the rising or setting of the sun on the day of the solstice. Alternatively, a hole in the roof of a structure would allow the noonday sun to shine onto a marker set into the floor.



*Stonehenge is perhaps the best known and most widely studied ancient celestial marker.*

civilizations, almost any change in the celestial “status quo” indicated a sign of some sort. Whether because of spiritual beliefs or due to a rudimentary attempt to apply an understanding to what they were witnessing, celestial events were a significant factor in the minds of the people that lived then. To ancient man, the sky above represented the heavens and the heavens were out of reach to mortal man, it was a place where mysterious things took place. And surely, the purpose of those things was to provide a sign or an indicator from the gods who occupied that place. Ancient man made every attempt to mark and predict the coming of these celestial indicators. Carved or painted symbols, sticks, stones and other such items would suffice to line up the heavens with the earth below. In the case of the solstice, in many instances, a marker would be located at the end of a long passage that was exposed to sunrise or sunset. It would

In the northern latitudes, the summer was a time of joy for the ancient Aboriginal people. The snow had disappeared; the ground had thawed out; warm temperatures had returned; flowers were blooming; leaves had returned to the deciduous trees. Food was easier to find. The crops had already been planted and would be harvested in the months to come. Although many months of warm/hot weather remained before the fall, they noticed that the days were beginning to shorten, so that the return of the cold season was inevitable.

So this time of year, between the planting and harvesting of the crops, was indeed the best time of year for celebration and it was marked by the coming of the solstice. ★

## SUPERNOVA

*(Continued from page 3)*

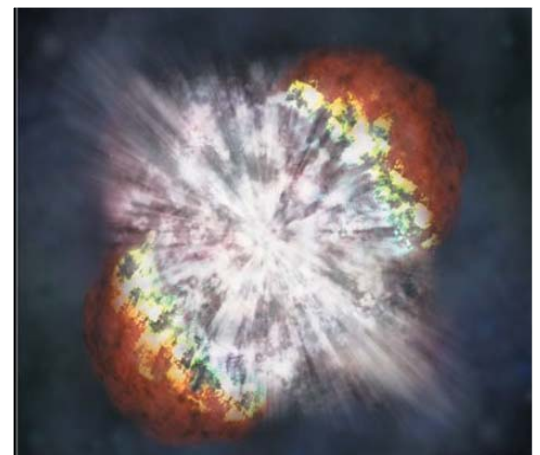
Supernovas usually occur when massive stars exhaust their fuel and collapse under their own gravity. In the case of SN 2006gy, astronomers think that a very different effect may have triggered the explosion. Under some conditions, the core of a massive star produces so much gamma ray radiation that some of the energy from the radiation converts into particle and anti-particle pairs. The resulting drop in energy causes the star to collapse under its own huge gravity.

After this violent collapse, runaway thermonuclear reactions ensue and the star explodes, spewing the remains into space. The SN 2006gy data suggest that spectacular supernovas from the first stars - rather than completely collapsing to a black hole as theorized - may be more common than previously believed.

“In terms of the effect on the early universe, there’s a huge difference between these two possibilities,” said Smith. “One pollutes the galaxy with large quantities of newly made elements and the other locks them up forever in a black hole.”

The results from Smith and his colleagues will appear in *The Astrophysical Journal*. ★

*Artists concept of SN2006gy supernova.*



NASA Illustration

# The RAC Essentials

## MONTHLY CALENDAR

201-768-2238  
or 845-47STARS

**Message Hotline: The latest information or last minute changes to club events.**

### Prime Observing

### June 10 thru 22

Fri/Sat, June 8 & 9	Observing at Wawayanda (members night)*
Tue. June 12, 8pm	Advisory Committee Meeting LHVCC, Airmont, N.Y.
Fri/Sat, June 15 & 16	Observing at Wawayanda (members night)*
Sat, June 16	Up all night Observing at Taghkanic State Park (members night)*
Tues. June 19 -9PM	Jupiter Jubilee Rockland Com. College, Suffern, NY
Sat. June 23	Joy of the Universe At: Anthony Wayne Rec. Area

## LOCATIONS

## ADVISORY CMTE.

### Clarkstown South Planetarium

31 Demarest Mill Rd,  
West Nyack, NY

### Rockland Community College

College Road, Suffern, NY

### Lower Hudson Valley

### Challenger Center

Rt. 59, Suffern, NY

### Anthony Wayne

### Recreation Area\*

Exit 17, P.I.P., NY

### Silvermine Ski Area\*

Exit 18, P.I.P., NY

### Wawayanda State Park\*

973-853-4462,  
Highland Lakes, NJ

### Taghkanic State Park\*

Taconic State Parkway,  
Ancram, NY

Jose Alvira  
Frank Bifulco  
Jim Burnell  
Mark Hettinger  
Mies Hora  
Rob Lyons  
Keith Murdock  
Al Nagler  
Dr. Jack Rosen  
Audry Salvatore  
Len Salvatore  
Ed Siemenn, *Chairman*  
Bernie Sokolowski  
Bill Thys  
Alan Traino

### Life & Honorary Members

Tom Massey (L)  
Al Nagler (L)  
Don Urban (L)  
Dr. Saeed Safaie (H)  
Andrew Warrington (H)

\*Special permits required to observe at these locations. Contact Frank Bifulco for permit info.

## KEY PERSONNEL

Contact any person on this list for advice on a specific topic:

### Membership Services

Bill Thys, 201-797-9553  
Memberships@RocklandAstronomy.com

### Journal Editor

Angela Ynette, 845-461-4799  
Editor@RocklandAstronomy.com

### Special Events & Observing

Frank Bifulco, 914-523-6548  
Observing@RocklandAstronomy.com

### Northeast Astronomy Forum

Alan Traino, 973-427-2020  
NEAF@RocklandAstronomy.com

### Summer Star Party

Jose Alvira, 845-446-4336  
SummerStarParty@RocklandAstronomy.com

### Media Services & Lecture Series

Keith Murdock, 845-786-5645  
Media@RocklandAstronomy.com

### Accounting

Mark Hettinger, 201-768-5720  
Mark.Hettinger@RocklandAstronomy.com

### Program Director

Jose Alvira, 845-446-4336  
JoseAlvira@RocklandAstronomy.com

### Club Library

Audrey Salvatore, 845-928-6697  
Library@RocklandAstronomy.com

### Webmaster

James Burnell, 845-986-3332  
Webmaster@RocklandAstronomy.com

### Educational & Children's Programs

Ed Siemenn, 845-461-4799  
EdSiemenn@RocklandAstronomy.com

### Astrophotography

Bill Thys, 201-797-9553  
BillThys@RocklandAstronomy.com

### CCD Imaging

James Burnell, 845-986-3332  
JimBurnell@RocklandAstronomy.com

### Senior Advisor

Al Nagler