

Sky **WAA** tch



The Final Flight of Atlantis

On May 14th, Mike Virsinger took this image of STS-132--the final scheduled flight of the Atlantis Space Shuttle. Atlantis launched on schedule at 2:20 PM EDT from Pad 39A having only a 10 minute launch window. Primary Payload: 34th station flight (ULF4), Integrated Cargo Carrier (ICC), Mini Research Module (MRM1).

This shot was taken seconds after liftoff from the NASA Causeway approximately 5 miles from the launch pad using a Canon XSi camera at the prime focus of a Celestron Onyx 80EDF 500mm f/6.25 refractor. The focus, 1/3200 sec exposure and ISO 200 were manually set.

Events for July 2010

WAA Lectures

Meeting Notice

There will no WAA lectures for the months of July and August at Pace University. See below for information on Starways to Heaven at Ward Pound Ridge Reservation. Monthly lectures will resume in September.

Starway to Heaven

Saturday July 10th, 8:30-11:00PM

Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

The July event will feature "Dome Night Under the Stars", with explorations of the night sky led by members of the WAA. Also featuring viewing through members' telescopes. Bring yours! The scheduled rain/cloud date is July 17th. Participants and guests should read our [General Observing Guidelines](#).

Lydia Maria Petrosino - Bronxville
Amelia Lawrence - Millwood
Glen and Patricia Lalli - White Plains



John Paladini divides light at the WAA Picnic

New Members. . .

Sushil Khanna - Katonah
Michael Clark - Pleasantville

Renewing Members. . .

John Paladini - Mahopac
Bill Newell - Mount Vernon
Charlie Gibson - Scarsdale
Pat Mahon - Yonkers
Doug Baum - Pound Ridge
Ruth and Eugene Fischer - Pleasantville
Erik and Eva Andersen - Croton-on-Hudson
Robie Burke - Katonah
Arthur Linker - Scarsdale
Gregory DiNome - Hawthorne
Charles Schulster - Crompond



Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at:

<http://www.westchesterastronomers.org/>.

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is \$25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Mike Virsinger; Vice President: Charlie Gibson; Vice President Programs (lectures): Pat Mahon; Treasurer: Doug Baum; Vice President Membership: Paul Alimena; Vice President Field Events: David Butler; Newsletter: Tom Boustead.

Articles and Photos

Black Holes No Joke by Dr. Tony Phillips

Kip Thorne: Why was the black hole hungry?

Stephen Hawking: It had a light breakfast!

Black hole humor—you gotta love it. Unless you're an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution.

How do you observe an object that eats light for breakfast? "Black holes are creatures of gravity," says physicist Marco Cavaglia of the University of Mississippi. "So we have to use gravitational waves to explore them."

Enter LIGO—the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein's Theory of General Relativity, black holes and other massive objects can emit gravitational waves—ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth.

"The principle is simple," says Cavaglia, a member of the LIGO team. "Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by."

Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! "It is a difficult measurement," allows Cavaglia.

Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave. Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth. So far the results are ...

nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection.

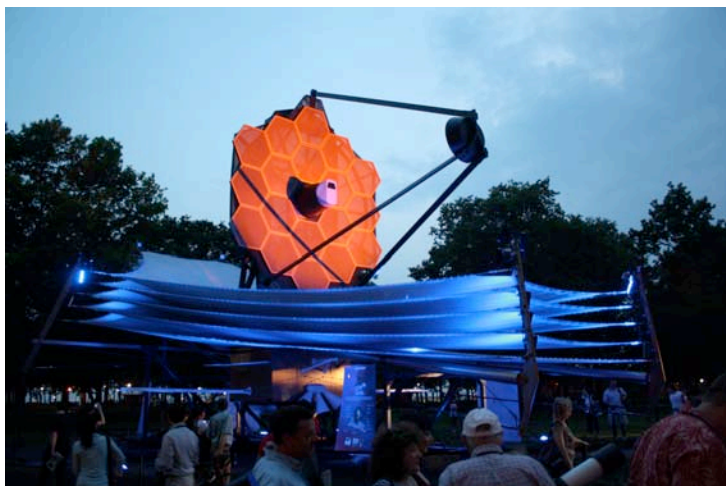
Does this mean Einstein was wrong? Cavaglia doesn't think so. "Einstein was probably right, as usual," he says. "We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range."

So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO—a next generation detector 10 times more sensitive than its predecessor. "We'll be monitoring a volume of space a thousand times greater than before," says Cavaglia. "This will transform LIGO into a real observational tool." When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punchline may yet make astronomers smile.

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

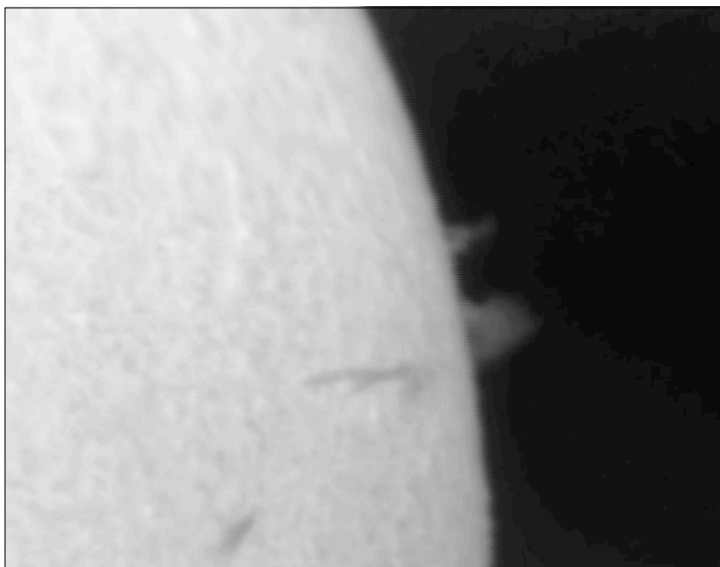


Laser Interferometer Gravitational-wave Observatory in Livingston, Louisiana. Each of the two arms is 4 kilometers long. LIGO has another such observatory in Hanford, Washington.



◀ **New Space Scope**

Bob Kelly took this photo of a full-size mock-up of the James Webb Space Telescope, to be launched in 2014. Its 6.5 meter mirror will look at infrared light to see through the dusty clouds of our Milky Way and reveal stars forming planetary systems. The model of the Webb, the size of a tennis court, was in New York City for the World Festival of Science in early June. Bob used a Canon Rebel XS f/3.5, 1/15 second, ISO-800, 18 mm (wide angle), in evening twilight. For details on the JWST mission go to:



◀ **Solar Activity**

Larry Faltz used his Lunt 60mm H-alpha double-stacked scope (0.5 A bandpass), and an inexpensive Meade Electronic Eyepiece, to shoot this image of the Sun. The scope was mounted on a Tech200/Giro-2 "track and train" drive. He captured a one-minute avi file using DeepSky Imaging on a netbook with an inexpensive USB-video adaptor. Larry ran the avi through Registax 5 to stack the images (1275 frames) and then Photoshop to enhance the contrast. Says Larry, the MEE only has 320 x 240 pixels and so doesn't give much detail compared with the spectacular view through an eyepiece, but it was a simple process to capture and process the image.



◀ **Chewing the Fat**

WAAers kick back at the WAA picnic.

Constellation Corner

by Matt Ganis

Welcome to July – can you believe we're saying that ALREADY? Where is this year going? Anyway, when I think of July I always associate it with fireworks and parades. So I was trying to figure out where in the sky I'd find either one of those. Now I guess I could always talk about a "parade" of constellations, but that's too easy. So I was thinking about fireworks, and globular clusters come to mind. They look like fireworks bursting in my July sky.

One quick look at my almanac and one of the grandest of the globulars "popped out" at me: M13 – the great Hercules cluster.

Hercules (or Heracles) was named after the greatest of the Greek goddesses: Hera. Heracles means "the glory (or honor) of Hera". Hera was the daughter of Cronus, and sister of the great god Zeus (they were actually twins). As the sordid story goes, Zeus at one point changed himself into a cuckoo in order to seduce his sister and the two were married. Hera then became the Queen of the Heavens: goddess of childbirth, marriage, and of women. She was the most widely beloved of goddesses in antiquity.

Although named after Hera, Hercules didn't have her immediate respect. He was the son of Zeus and a mortal woman (Alcmene). Hera resented Zeus' flirtatious nature, and tried to have the child killed. She sent two monstrous snakes to his crib, but the infant strangled them both with his pudgy little hands, thus setting the stage for a long and heroic life.

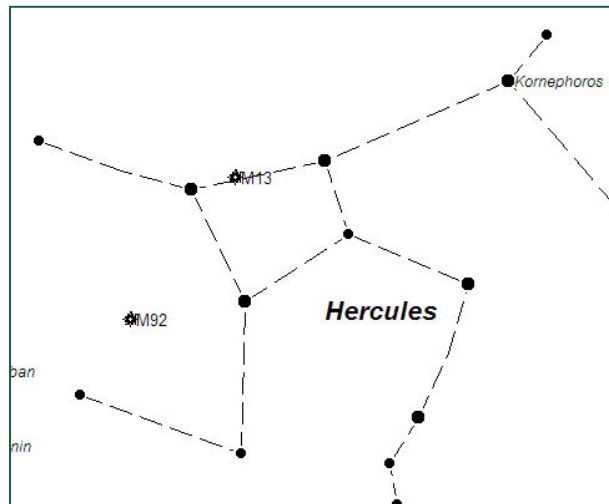
There are two Messier objects in Hercules: M13 and M92. M13 (or NGC 6205) is a spectacular globular cluster sometimes known as "The Hercules Cluster". It is universally acclaimed as the best

globular in the northern hemisphere. This is a very compact cluster of over a million stars. And by any account, it is also very old – with an estimated age of about ten billion years. It's also fairly far from us, located around 25,000-30,000 light years away.

Globular clusters are a spherically symmetric collection of stars which (typically) share a common origin – to relate this to our July skies, think of a the bright "explosion" of fireworks (but going in the reverse direction).

Star clusters are important because, within each cluster, member stars are probably at the same distance from the Sun, and have the same age and the same initial chemical composition. So, the study of globular clusters has now become an indispensable tool for astronomers specializing in stellar evolution. A star cluster is group of stars that formed out of the same molecular cloud, and which remains bound together by the mutual gravitational attraction of its components. With the realization that most stars originate as members of clusters it follows that

astronomers that are seeking a consistent picture of the early stages of stellar evolution will, inevitably, be confronted with the study of clusters and associations.



Almanac

For July 2010 by Matt Ganis

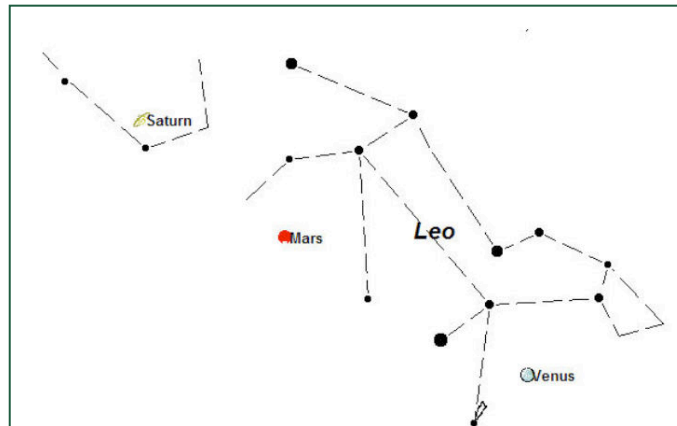


There's nothing like ending these long summer days with a stroll under a star filled sky as the day begins to cool from the sweltering heat. The month of July opens with an interesting planetary configuration in our western skies, a brightening comet and a few close encounters. So after you watch the man-made spectacle in the skies, turn your attention to Mother Nature's "fireworks" – hey, who can argue with a "two for the price of one" deal?

At the start of the month, there's an interesting "conjunction" of planets in our western skies. Normally when we discuss conjunctions in the sky, we refer to astronomical objects that are "close" together in the sky. In this case, the three planets, Venus, Mars and Saturn are lined up (along the ecliptic) across the feet of Leo into the constellation of Virgo.

Starting at the western horizon, we have the planet Venus, shining at a magnitude of about -4.0 - an incredible sight! If you have a decent view of the horizon, the bright and beautiful planet will remain in our evening skies until approximately 10pm eastern time. Keep an eye on Venus throughout the month as it traces a path along the feet of Leo. On the 14th of the month, watch as a very thin crescent moon comes within about 5° of the bright planet.

Moving to the west, located at the hind leg of Leo, you'll find the ruddy planet Mars, shining at a meager +1.5 magnitude – almost 100x dimmer than Venus in our evening sky. Mars is slowly making its way into the constellation of Virgo where it will have a close encounter with Saturn at month's end. The two planets are about the same brightness (anywhere between +1.0 and +1.5 magnitude) and will come within about 1° of each other on the 30th of the month.



If you do have a great view of the horizon, around the 12th of July, the little planet Mercury gets into the mix by making an appearance just below Venus along the western horizon. It won't be in the sky very long, having set by 9:30pm but it's bright enough (and potentially high enough in the sky by around the 20th) to make for an interesting sighting in the sky.

Don't forget: On July 2, the newly discovered comet McNaught makes its closest approach to the Sun. It will be visible in the early morning sky just before dawn for several weeks before and will grow gradually brighter as the month of July opens. Make sure you find a dark location far away from city lights.

The comet will appear as a dim, fuzzy spot of light. A good pair of binoculars will really help to make it clearly visible. It is too early to tell if the comet will grow a tail visible to the naked eye

And since it IS the month of July, we have to look for other kinds of fireworks in the sky. The Delta Aquarids usually produce about 20 meteors per hour at their peak (a pretty decent fireworks show). The shower usually peaks on July 28 & 29, but some meteors can also be seen from July 18 through August 18. The radiant point for this shower will be in the constellation Aquarius with the best viewing to the east just after midnight.

So enjoy of the wonderful displays in our evening skies after your 4th of July picnics!!!