IO - December 2008

Issue 2008-12

Eugene Astronomical Society
Annual Club Dues $25
President: Sam Pitts - 688-7330
Secretary: Jerry Oltion - 343-4758
Additional Board members:
Jacob Strandlien, Tony Dandurand,
Tommy Lightning Bolt.

www.eugeneastro.org

EAS is a proud member of:

The Astronomical League

NEXT MEETING: DECEMBER 18TH

Swap Meet & Potluck Get-Together

Our December meeting will be a chance to visit and share a potluck dinner with fellow amateur astronomers, plus swap extra gear for new and exciting equipment from somebody else's stash. Bring some food to share, and any astronomy gear you'd like to sell, trade, or give away.

We'll also have a raffle for several brand-new eyepieces and filters. Ticket will go on sale from 6:30 PM till 7:30 PM, and the drawing will begin at 7:35 PM. Tickets will cost $3 for one, or $5 for two. Only one trip to the prize table per person. If any prizes remain after everyone has received a chance, then we'll have a 2nd chance drawing. Your name must be on your ticket and you must be present to Win!

We also encourage people to bring any new gear or projects they would like to show the rest of the club.

First Quarter Fridays for 2009

Our "First Quarter Friday" series of star parties has been a resounding success. Every month (with the exception of November, which was clouded out) we've had anywhere from 6-12 club members with telescopes on the College Hill Reservoir and dozens of interested members of the public eager for a view through the eyepiece. We're going to continue the tradition next year. Here are the dates through December of 2009. Note that we have two parties in January and May, but none in February.

December 5th, 2008
January 2, 2009
January 30, 2009
March 6, 2009
April 3, 2009
May 1, 2009
May 29, 2009
June 26, 2009
July 31, 2009
August 28, 2009
September 25, 2009
October 23, 2009
November 27, 2009
December 25, 2009

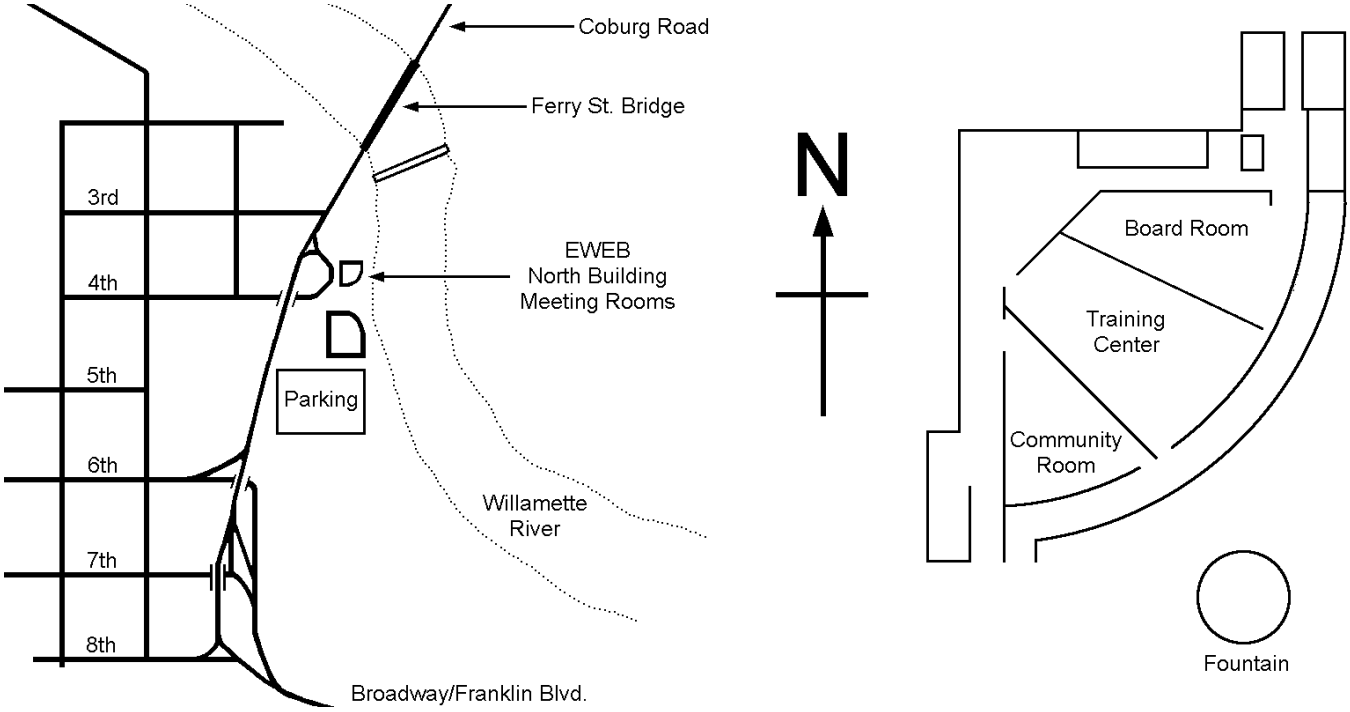
REMEMBER THAT WE NOW MEET AT EWEB

500 E. 4th Avenue in Eugene.

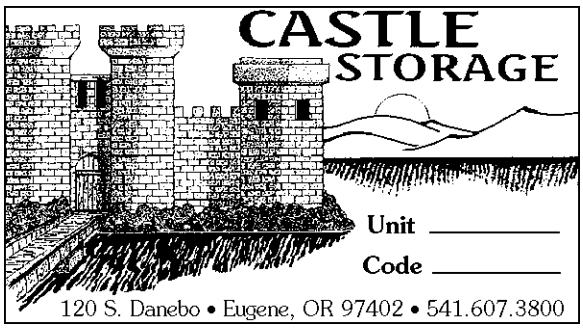
OUR NEXT MEETING WILL BE ON THURSDAY, DECEMBER 18TH AT 7:00 IN THE NORTH BUILDING'S COMMUNITY ROOM. This is in the semicircular building to the north of the fountain at EWEB's main campus on the east end of 4th Avenue.

Meeting dates for 2009: (All meetings are at 7:00 in the Community Room)

January 22	February 26	March 26	April 23
May 28	June 25	July 23	August 27
September 24	October 22	November 19	December 17



EWEB is located at 500 E. 4th Avenue.
EAS meets in the first room in the semicircular building to the north of the fountain.



Thank You Castle Storage

Board member Tommy Lightning Bolt was instrumental in getting a storage unit from the owners of Castle Storage for EAS to store its telescopes and equipment. EAS would like to thank Castle Storage for their generosity and support for our group. Please give them a call if you need a storage space, and tell your friends. They are great people and offer secure and quality units.

Observing in December

1st Q Full Last Q New

December 5	December 12	December 19	December 27
Mercury Set: 4:46 PM	Mercury Set: 5:02 PM	Mercury Set: 5:25 PM	Mercury Set: 5:56 PM
Venus Set: 7:40 PM	Venus Set: 7:56 PM	Venus Set: 8:12 PM	Venus Set: 8:30 PM
Mars behind Sun	Mars behind Sun	Mars behind Sun	Mars behind Sun
Jupiter Set: 7:24 PM	Jupiter Set: 7:04 PM	Jupiter Set: 6:46 PM	Jupiter Set: 6:22 PM
Saturn Rise: 12:21 AM	Saturn Rise: 11:51 PM	Saturn Rise: 11:25 PM	Saturn Rise: 10:54 PM
Uranus Set: 12:17 AM	Uranus Set: 11:46 PM	Uranus Set: 11:19 PM	Uranus Set: 10:49 PM
Neptune Set: 9:53 PM	Neptune Set: 9:26 PM	Neptune Set: 9:00 PM	Neptune Set: 8:29 PM
Pluto Set: 6:04 PM	Pluto Set: 5:38 PM	Pluto Set: 5:11 PM	Pluto behind Sun

All times: Pacific Standard Time (Nov 2, 2008-March 8, 2009) = UT -8 hours or U.S. Pacific Daylight Time (March 8-November 1, 2009) = UT -7 hours.

Date	Moonrise	Moonset	Sunrise	Sunset	Twilight Begin	Twilight End
12/1/2008	10:50	20:01	07:28	16:35	05:45	18:19
12/2/2008	11:18	21:06	07:29	16:35	05:46	18:18
12/3/2008	11:42	22:11	07:30	16:35	05:46	18:18
12/4/2008	12:04	23:17	07:31	16:35	05:47	18:18
12/5/2008	12:23		07:32	16:34	05:48	18:18
12/6/2008	12:43	00:24	07:33	16:34	05:49	18:18
12/7/2008	13:04	01:33	07:34	16:34	05:50	18:18
12/8/2008	13:28	02:46	07:35	16:34	05:51	18:18
12/9/2008	13:58	04:04	07:36	16:34	05:52	18:18
12/10/2008	14:36	05:25	07:37	16:34	05:52	18:19
12/11/2008	15:26	06:46	07:38	16:34	05:53	18:19
12/12/2008	16:30	08:00	07:39	16:34	05:54	18:19
12/13/2008	17:46	09:03	07:39	16:34	05:55	18:19
12/14/2008	19:08	09:51	07:40	16:35	05:55	18:19
12/15/2008	20:29	10:28	07:41	16:35	05:56	18:20
12/16/2008	21:47	10:57	07:41	16:35	05:57	18:20
12/17/2008	23:00	11:21	07:42	16:36	05:57	18:20
12/18/2008		11:42	07:43	16:36	05:58	18:21
12/19/2008	00:10	12:02	07:43	16:36	05;58	18:21
12/20/2008	01:17	12:22	07:44	16:37	05:59	18:22
12/21/2008	02:24	12:44	07:44	16:37	05:59	18:22
12/22/2008	03:30	13:09	07:45	16:38	06:00	18:23
12/23/2008	04:36	13:39	07:45	16:38	06:00	18:23
12/24/2008	05:39	14:16	07:46	16:39	06:01	18:24
12/25/2008	06:38	15:00	07:46	16:40	06:01	18:25
12/26/2008	07:30	15:52	07:46	16:40	06:02	18:25
12/27/2008	08:15	16:50	07:47	16:41	06:02	18:26
12/28/2008	08:51	17:53	07:47	16:42	06:02	18:27
12/29/2008	09:22	18:58	07:47	16:43	06:02	18:27
12/30/2008	09:47	20:03	07:47	16:44	06:03	18:28
12/31/2008	10:08	21:08	07:47	16:44	06:03	18:29

All times are for Eugene, Oregon Latitude 44º 3' 8" Longitude 123º 5' 8" for listed date

Other Items of Interest This Month

All month: Venus steadily rising in evening sky
Mercury visible in evening sky during last week of the month
12/5 First Quarter Friday star party
12/10 Moon occults Pleiades
12/13 Peak of Geminid Meteors
12/20 Longest night of the year. Go observing!
12/27 Neptune and Venus within 1.5 °
12/30 Mercury and Jupiter within 1.5° at sunset

For Current Occultation Information

Visit Derek C. Breit's web site

"BREIT IDEAS Observatory"

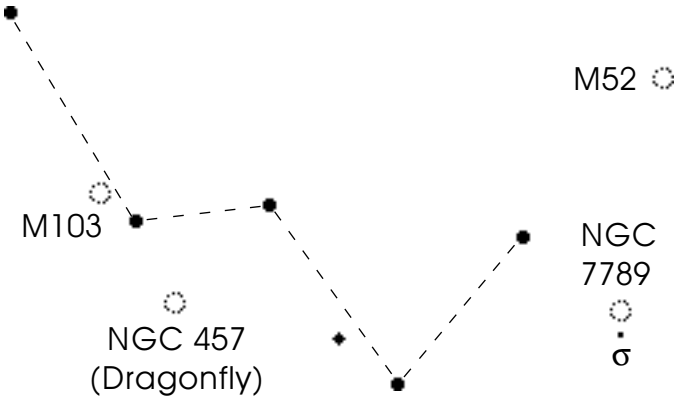
http://www.poyntsource.com/New/Regions/EAS.htm

Go to Regional Events and click on the Eugene, Oregon section. This will take you to a current list of Lunar & asteroid events for the Eugene area. Breit continues to update and add to his site weekly if not daily. This is a site to place in your favorites list and visit often.

Observing Highlight: NGC 7789

Cassiopeia is home to many open clusters, the most famous of which is probably M52, the bright, rich group of 100 or so members straight out from the right leg of the constellation's prominent "W." M103 is also a common target, with its 50+ members offering a more sparse but still rewarding view. And there's always the Dragonfly (NGC 457) down in the bottom of the "W," a reliable favorite at star parties because it really does look like a dragonfly.

The constellation's best kept secret, however, has to be NGC 7789. Encompassing well over 100 stars, it glows softly at 6-7th magnitude, just visible to the naked eye in dark skies as a nebulous patch against the hazy background of the Milky Way. In a telescope at low to medium power, it's a visual delight, its member stars shining just bright enough to stand out from the nebulosity of the thousands of stars in the Milky Way beyond it. Its core is about 5 arc-minutes in diameter and very evenly distributed, surrounded by a more sparsely populated halo mottled with bright clumps and dark gaps. It's definitely an object that rewards careful examination, as more and more structure becomes evident the more you look. This is not a knock-your-socks off cluster; this is a cluster that will warm you from the retinae inward the longer you watch and admire it.



NGC 7789

Its stars have been dated to nearly 2 billion years old, making this one of the oldest known open clusters. Its distance is not well known, but is estimated at about 6000 light-years, which means it spans 45-50 light-years.

Messier missed this one, but Carolyn Herschel spotted it in 1783. This was one of her seven original discoveries.

NGC 7789 can be seen through Eugene's skyglow, but its true glory is best enjoyed from a darker sky.

To find NGC 7789, follow the right leg of Cassiopeia's "W" from the bottom to its tip, then turn 90 degrees to the right and go just a touch over half that distance. The cluster sits about one degree north of sigma (σ) Cass., the brightest star in the area.

For go-to people or people using setting circles, NGC 7789's R.A is 23:57.4 and the Dec is +56:43.

What Happened to Comet Holmes?

by Dr. Tony Phillips

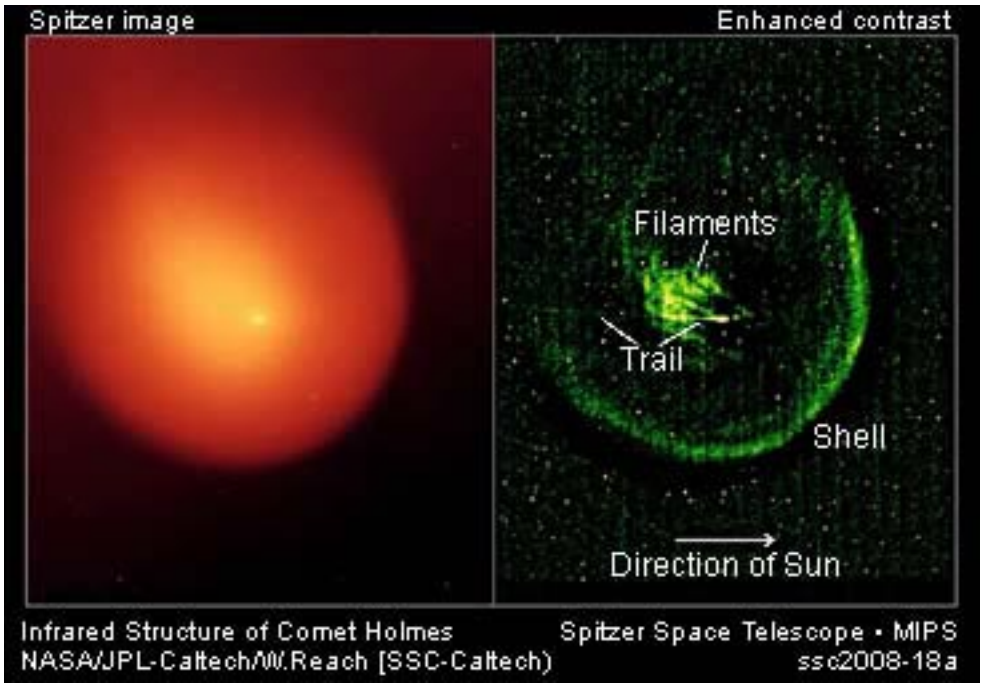
One year after Comet 17P/Holmes shocked onlookers by exploding in the night sky, researchers are beginning to understand what happened.

"We believe that a cavern full of ice, located as much as 100 meters beneath the crust of the comet's nucleus, underwent a change of phase," says Bill Reach of NASA's Spitzer Science Center at the California Institute of Technology. "Amorphous ice turned into crystalline ice" and, in the transition, released enough heat to cause Holmes to blow its top.

Anyone watching the sky in October 2007 will remember how the comet brightened a million-fold to naked-eye visibility. It looked more like a planet than a comet—strangely spherical and utterly lacking a tail. By November 2007, the expanding dust cloud was larger than Jupiter itself, and people were noticing it from brightly-lit cities.

Knowing that infrared telescopes are particularly sensitive to the warm glow of comet dust, Reach and colleague Jeremie Vaubaillon, also of Caltech, applied for observing time on the Spitzer Space Telescope—and they got it. "We used Spitzer to observe Comet Holmes in November and again in February and March 2008," says Reach.

The infrared glow of the expanding dust cloud told the investigators how much mass was involved and how fast the material was moving. "The energy of the blast was about 10^{14} joules and the total mass was of order 10^{10} kg." In other words, Holmes exploded like 24 kilotons of TNT and ejected 10 million metric tons of dust and gas into space.



Comet Holmes as imaged by the multiband imaging photometer (MIPS) on the Spitzer Space Telescope. The enhanced contrast image at the right shows the comet's outer shell and mysterious filaments of dust.

These astonishing numbers are best explained by a subterranean cavern of phasechanging ice, Reach believes. "The mass and energy are in the right ballpark," he says, and it also explains why Comet Holmes is a "repeat exploder."

Another explosion was observed in 1892. It was a lesser blast than the 2007 event, but enough to attract the attention of American astronomer Edwin Holmes, who discovered the comet when it suddenly brightened. Two explosions (1892, 2007) would require two caverns. That's no problem because comets are notoriously porous and lumpy. In fact, there are probably more than two caverns, which would mean Comet Holmes is poised to explode again.

When?

“The astronomer who can answer that question will be famous!” laughs Vaubaillon.

“No one knows what triggered the phase change,” says Reach. He speculates that maybe a comet-quake sent seismic waves echoing through the comet’s caverns, compressing the ice and changing its form. Or a meteoroid might have penetrated the comet’s crust and set events in motion that way. “It’s still a mystery.”

But not as much as it used to be.

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

A Flash of Insight

from Science@NASA.gov

There are places on the Moon where the sun hasn’t shined for millions of years. Dark polar craters too deep for sunlight to penetrate are luna incognita, the realm of the unknown, and in their inky depths, researchers believe, may lie a treasure of great value.

NASA is about to light one up.

Sometime between May and August 2009, depending on launch dates, the booster stage for NASA’s LCROSS probe will deliberately crash into a permanently-shadowed lunar crater at 9,000 km/hr, producing an explosion equivalent to about 2,000 pounds of TNT (6.5 billion joules). The blast will jettison material out of the crater into broad daylight where astronomers can search the debris for signs of lunar water.

Water is the treasure. NASA plans to send people back to the Moon by 2020 and eventually set up a lunar outpost. Water would be an invaluable resource for astronauts living and working on the Moon. Not only could people drink it, but water could be used to grow plants for food, or it could be split into hydrogen for rocket fuel and oxygen to replenish the outpost's air. It even could shield astronauts from dangerous space radiation.

Hence the kamikaze mission, called the Lunar CRater Observation and Sensing Satellite (LCROSS), to search for H2O on the Moon. “If LCROSS’s booster stage hits a patch of lunar regolith that contains at least 0.5 percent water ice, water should be detectable in the plume of ejecta,” explains Anthony Colaprete, principal investigator for LCROSS at NASA’s Ames Research Center.

The LCROSS booster stage hurtles toward the Moon as the mission's robotic satellite looks on.

The other half of the LCROSS mission, a robotic satellite, will observe the impact and then itself crash into the Moon 4 minutes later. Most of the Moon is bone dry, of course. With virtually no atmosphere and 300° temperature swings between night and day, most of the Moon’s surface is a hostile place for water. But there are a few cold, dark places where frozen water could stay put. At the lunar poles, the sun is always low on the horizon, so some crater ridges cast shadows that keep parts of the crater floors in perpetual darkness. Temperatures in the inky black shadows hover around 40° above absolute zero (-233° Celsius), cold enough for water ice to survive indefinitely.

"There's tantalizing evidence that water might be there," Colaprete says. A lunar orbiter called Clementine detected hints of water ice in some of these craters in 1994 and so did the 1999 Lunar Prospector mission, but unfortunately the data were not conclusive.

That's where LCROSS comes in. Ice blasted into the sunlight by the impact would vaporize. Ultraviolet light from the sun would then split the H2O molecules into H and OH. Mission planners hope LCROSS's sensors will detect the fingerprint of H20 in near-infrared light and also a characteristic wavelength emitted by OH at 308 nanometers.

Currently, Colaprete's team is searching for the best impact sites inside various shadowed craters. "The first and most important criterion is that we think the impact area will be productive from an ejecta standpoint," Colaprete explains. "If we don't get ejecta into sunlight, it wouldn't matter if we hit an iceberg because we would never know it." For example, if the impact site is close to a high crater wall, the ejecta would have to travel far to get out of the wall's shadow and reach the sunlight above. And if the impactor hits a steep slope in the bottom of a shadowed crater, much of the ejecta would blast out sideways instead of upward toward the sunlight. So a good site would be relatively flat-bottomed — less than about 15° of slope — with a fluffy regolith free of large boulders or rubble that would blunt the blow.

Colaprete says that, so far, one of the best sites appear to be in a 17 km-across unnamed crater just west of Peary crater (88.6° N, 33.0° E), near the Moon's north pole. "We've gone through essentially every possible launch date and picked a crater [for each date]," he says.

Choosing impact sites must also take another factor into account: visibility from Earth. Hundreds of amateur and professional astronomers will join the LCROSS robotic orbiter in watching the crash.

The explosion itself will probably be hidden by the walls of the target crater. Instead, what astronomers will look for is the impact plume. An expanding cone of ejecta will rise more than 6 kilometers above the lunar surface and spread outward for about 40 km in every direction. Glistening in the sunlight, the debris is expected to shine like a 6th to 8th magnitude star—invisible to the human eye but an easy target for backyard telescopes.

A plume of water vapor rises above the Moon's north pole

Colaprete's team will time the impact so that it happens while the Moon is high in the sky at night in Hawaii. There, LCROSS scientists will observe the ejecta plume with the powerful Infrared Telescope Facility. But astronomers on the west coast of the U.S. and in Japan could be able to see the impact as well, depending on the precise impact time. "It really is going to turn into an international event," Colaprete says. "Everyone's going to be training their eyes on the impact to observe it."

During the months leading up to the launch, amateur astronomers are encouraged to image the north and south poles of the moon. The goal is to obtain images that determine the scale of recognizable features observed in the wider field of view on amateur telescopes when compared the higher spatial resolution near-infrared IRTF images. A secondary goal is to compare the dynamic range of images that allow the verification of detection of subtle variations in topography and albedo. This exercise also may help amateurs to prepare for obtaining images of the impact plumes.

An online discussion group has been set up to facilitate amateur participation in NASA's LCROSS Observation Campaign. This group is designed to facilitate amateur participation in the LCROSS mission, posting and sharing images that will be of scientific value before launch, during flight, and during impact.

You can join the group by visiting http://groups.google.com/group/lcross_observation.

Hubble Directly Observes a Planet Orbiting Another Star

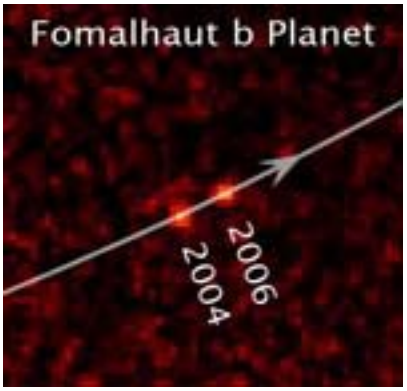
From Science@NASA.gov

NASA's Hubble Space Telescope has taken the first visible-light snapshot of a planet circling another star. Estimated to be no more than three times Jupiter's mass, the planet, called Fomalhaut b, orbits the bright southern star Fomalhaut, located 25 light-years away in the constellation Piscis Australis, or the "Southern Fish."

Fomalhaut has been a candidate for planet hunting ever since an excess of dust (a telltale sign of planet formation) was discovered around the star in the early 1980s by NASA's Infrared Astronomy Satellite, IRAS. In 2004, the coronagraph in the High Resolution Camera on Hubble's Advanced Camera for Surveys produced the first-ever resolved visible-light image of the region around Fomalhaut. It clearly showed a ring of protoplanetary debris approximately 21.5 billion miles across and having a sharp inner edge. This large debris disk is similar to the Kuiper Belt, which encircles the solar system and contains a range of icy bodies from dust grains to objects the size of dwarf planets, such as Pluto.

Hubble astronomer Paul Kalas, of the University of California at Berkeley, and team members proposed in 2005 that the ring was being gravitationally modified or "shepherded" by a planet lying between the star and the ring's inner edge.

Now, Hubble has actually photographed a point source of light lying 1.8 billion miles inside the ring's inner edge. The results are being reported in the November 14 issue of Science magazine.



"Our Hubble observations were incredibly demanding. Fomalhaut b is 1 billion times fainter than the star. We began this program in 2001, and our persistence finally paid off," Kalas says.

Observations taken 21 months apart by Hubble's Advanced Camera for Surveys' coronagraph show that the object is moving along a path around the star, and is therefore gravitationally bound to it. The planet is 10.7 billion miles from the star, or about 10 times the distance of the planet Saturn from our sun.

The planet is brighter than expected for an object of three Jupiter masses. One possibility is that it has a Saturn-like ring of ice and dust reflecting starlight. The ring might eventually coalesce to form moons. The ring's estimated size is comparable to the region around Jupiter and its four largest orbiting satellites.

Kalas and his team first used Hubble to photograph Fomalhaut in 2004, and made the unexpected discovery of its debris disk. At the time they noted a few bright sources in the image as planet candidates. A follow-up image in 2006 showed that one of the objects had changed position since the 2004 exposure. The amount of displacement between the two exposures corresponds to an 872-year-long orbit as calculated from Kepler's laws of planetary motion.

Future observations will attempt to see the planet in infrared light and will look for evidence of water vapor clouds in the atmosphere. This would yield clues to the evolution of a comparatively newborn 100-million-year-old planet. Astrometric measurements of the planet's orbit will provide enough precision to yield an accurate mass.

NASA's James Webb Space Telescope, scheduled to launch in 2013 will be able to make coronagraphic observations of Fomalhaut in the near- and mid-infrared. Webb will be able to hunt for other planets in the system and probe the region interior to the dust ring for structures such as an inner asteroid belt.