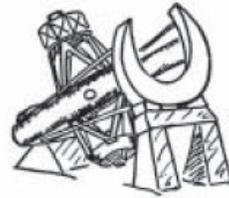


The Big Eye



The Newsletter of the Friends of Palomar Observatory

Vol 6, No. 1

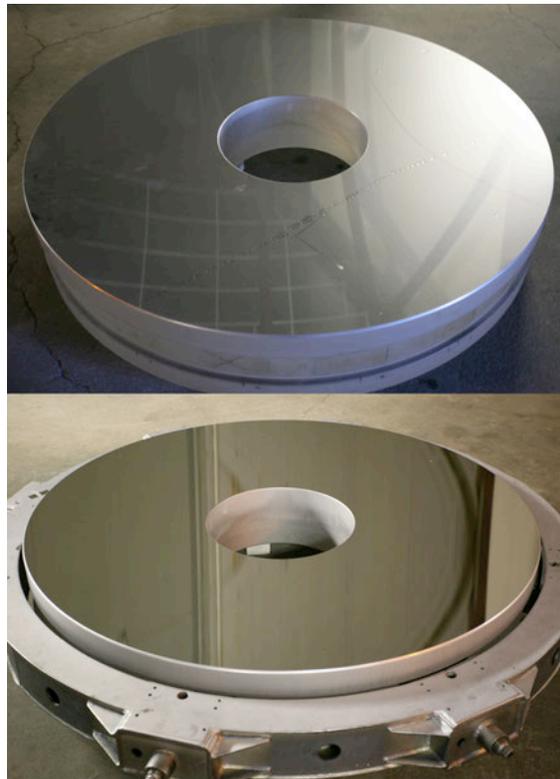
60-inch Mirror Successfully Re-aluminized in August

After two years of nearly constant use it was finally time to give the the primary mirror of Palomar's 60-inch telescope a fresh coating of aluminum. The Palomar day crew pulled the mirror from the 60-inch on Monday, August 16. Once the mirror was removed from the telescope it was brought to the ground floor where measurements of the old reflective coating were made. From there it was transported to the ground floor of the dome of the 200-inch telescope. This was delayed until the next morning because of a thunderstorm. After the mirror was safely brought to the ground floor of the 200-inch, work promptly began.

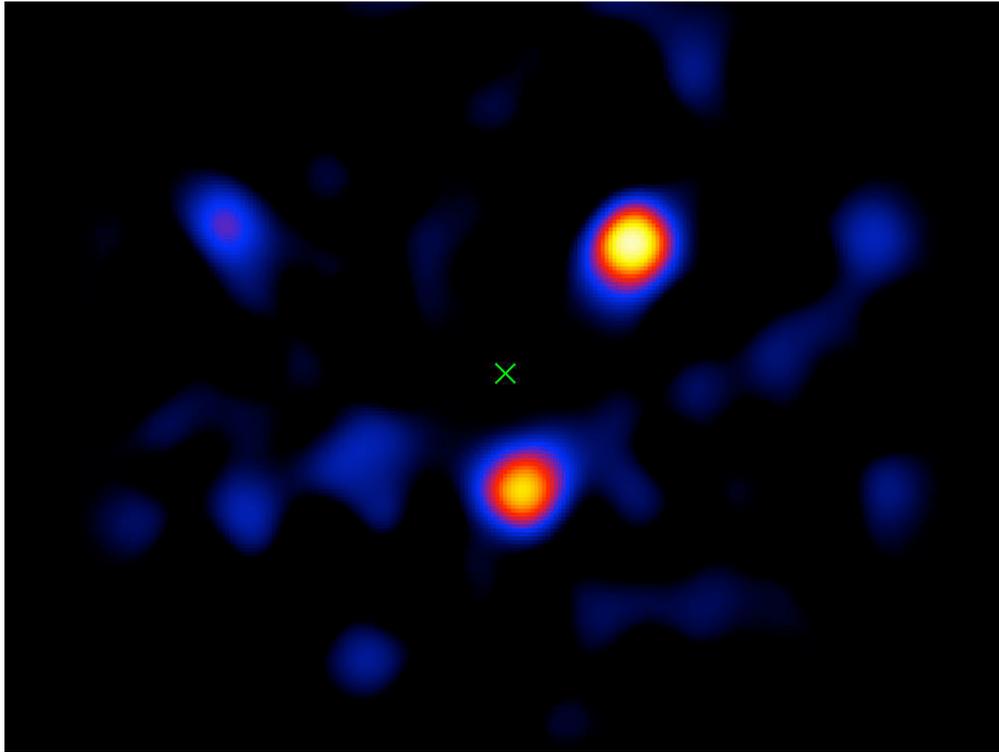
The first task was to wash the mirror with soap and water. Afterwards the mirror's reflective coating was dissolved away and the bare glass was treated with various chemicals to get it as clean as possible. The nearly 2-ton quartz disk was given a final rinse with distilled water and carefully dried.

From there it was carefully placed into the aluminizing chamber. Over a period of about a day the air was pumped from the chamber before a few grams of aluminium was vaporized to form the disk's new reflective coating.

Upon removal from the chamber, the new coating was evaluated and the mirror was returned to its home. After some time to reinstall and re-align the mirror astronomers reported that they are receiving excellent crisp, bright images of stars.



Exoplanets Photographed with Hale Telescope



The image above shows three exoplanets – planets that orbit a star other than our sun. It was taken in infrared light with Palomar Observatory's 200-inch Hale Telescope. The three planets, called HR8799b, c and d, are thought to be gas giants similar to Jupiter, but more massive. They orbit their host star at roughly 24, 38 and 68 times the distance between our Earth and sun, respectively (our Jupiter resides at about five times the Earth-sun distance).

The star HR 8799 is a bit more massive than our sun, and much younger, at about 60 million years, compared to our sun's approximately 4.6 billion years. It is 120 light-years away in the constellation Pegasus.

The image was captured using a 1.5-meter-diameter (4.9-foot) portion of the Hale telescope's 200-inch mirror and a method called adaptive optics to reduce the amount of atmospheric blurring (to take away the "twinkle" of the star). Once the twinkle was removed, the light from the star itself was blocked using a coronagraph, an instrument that selectively masks out the star. The final result was an image showing the light of three planets. The Hale Telescope's adaptive optics is in the process of getting a major upgrade. Look for information on that early in 2011.

Palomar Transient Factory Supernova Count on the Rise

An exploding star is called a supernova. Astronomers have been systematically hunting them since Fritz Zwicky began his first survey for them with Palomar's 18-inch Schmidt telescope in 1936. Dr. Zwicky found 120 of them in his lifetime.

Modern astronomers have kicked supernova hunting into high gear with the Palomar Transient Factory. Wide-field images of the sky are made with Palomar's 48-inch Samuel Oschin Telescope. A new portion of the sky is photographed approximately every 90 seconds. Data is beamed away via High Performance Wireless and Research and Education Network to the Internet and then on to Lawrence Berkeley National Laboratory and the National Energy Research Scientific Computing Center. Once there computers using an "autonomous inspection code" identify new sources and transmit the findings back to Palomar where the robotic 60-inch telescope gets called upon for follow-up observations. Once confirmation of the object is obtained from the 60-inch telescope the next wave of observers is alerted who obtain a spectrum to classify the type of supernova (or other discovery).

In a case earlier this year all of this happened as expected. Ultimately a spectrum was obtained with the 10-meter Keck I telescope which was used to identify a new discovery as "a peculiar Type Ia supernova". The really amazing thing is that from discovery photograph to spectrum less than half an hour had elapsed! That is a very short period of time to photograph, identify and garner observations from multiple telescopes.

The Palomar Transient Factory Survey began last year. As this newsletter was going to press the total number of supernovae discovered so far by this survey (<http://www.astro.caltech.edu/ptf/>) had climbed to 684.

Last 60-inch Night of the Season

Reservations can now be taken for 2010's last Friends of Palomar Observatory 60-inch observing event. On Saturday, September 25 we will have a tour of the 200-inch Hale Telescope to be followed by observing with the 60-inch telescope (weather permitting).

Remember that a Friends of Palomar Observatory membership is required to attend. Space for our 60-inch nights is *very* limited. Advance reservations are required for all events!

E-mail friendsofpalomar@astro.caltech.edu or call (760) 742-2131 or (760) 742-2111 to make reservations.

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