'Extreme Physics' Observatory Prepares for Flight

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Scientists and engineers have completed assembly of the primary instrument for the Gamma-ray Large Area Space Telescope, or GLAST, a breakthrough orbiting observatory scheduled to launch from NASA's Kennedy Space Center in fall 2007.

The main instrument, called the Large Area Telescope, arrived on May 14, 2006, at the U.S. Naval Research Laboratory in Washington for environmental testing.

The mission, led by NASA with the Department of Energy and international partners, brings together the astrophysics and particle physics communities.

"With GLAST, physicists will gain valuable information about the evolution of the universe and physicists will search for signals that may even force revision of some of the basic laws of physics," said the telescope's principal investigator, Peter Michelson of Stanford University. "The completion of the Large Area Telescope assembly and its shipment from the accelerator center are major milestones in its development."

The observatory will detect light billions of times more energetic than what our eyes can see or what optical telescopes such as Hubble can detect. Key targets include powerful particle jets emanating from enormous black holes and possibly the theorized collisions of dark matter particles. The Large Area Telescope will be at least 30 times

more sensitive than previous gamma-ray detectors and will have a far greater field of view.

"The relative range of light energies that the instrument can detect is thousands of times wider than that of an optical telescope, which captures only a thin slice of the electromagnetic spectrum," said Project Scientist Steven Ritz of NASA's Goddard Space Flight Center, Greenbelt, Md. "The observatory provides a huge leap in capabilities in this important energy band, and it opens a wide window for exploration and discovery."

Unlike visible light, gamma rays are too energetic to be focused by traditional telescope mirrors onto a detector. The Large Area Telescope will employ detectors that convert incoming gamma rays into electrons and their antimatter partners, called positrons. This technique, a change of light into matter as described by Einstein's equation E=mc^2, is called pair conversion. It will enable scientists to track the direction of gamma rays and measure their energy.

The telescope will now undergo three grueling months of ‘shake and bake’ testing to ensure it will survive the intense vibration and noise during launch and operate properly in space. Electromagnetic interference tests also will be performed to ensure Large Area Telescope operations do not interfere with the spacecraft. When testing is finished at the Naval Research Laboratory, the instrument will be shipped to Arizona, where engineers at General Dynamics C4 Systems will integrate the Large Area Telescope and a second instrument, the Burst Monitor, onto the spacecraft.

Source: NASA/Goddard Space Flight Center, by Susan Hendrix

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