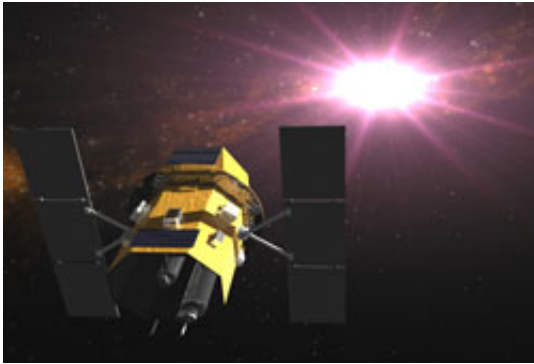


Swift Mission Nabs Its First Distance Measurement to Star Explosion

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The NASA-led Swift mission has measured the distance to two gamma-ray bursts -- back to back, from opposite parts of the sky -- and both were from over nine billion light years away, unleashed billions of years before the Sun and Earth formed.

These represent the mission's first direct distance, or redshift, measurements, its latest milestone since being launched in November 2004. The distances were attained with Swift's Ultraviolet/Optical Telescope (UVOT).

The Swift science team said that these types of distance measurements will become routine, allowing scientists to create a map to understand where, when and how these brilliant, fleeting bursts of light are created.

"Swift will detect more gamma-ray bursts than any satellite that has

come before it, and now will be able to pin down distances to many of these bursts too," said Dr. Peter Roming, UVOT Lead Scientist at Penn State. "These two aren't distance record-breakers, but they're certainly from far out there. The second of the two bursts was bright enough to be seen from Earth with a good backyard telescope."

Gamma-ray bursts are the most powerful explosions known in the Universe and are thought to signal the birth of a black hole --either through a massive star explosion or through a merger smaller black holes or neutron stars. Several appear each day from our vantage point. They are difficult to detect and study, however, because they occur randomly from any point in the sky and last only a few milliseconds to about a minute.

Swift, with three telescopes, is designed to detect bursts and turn autonomously within seconds to focus its telescopes on the burst afterglow, which can linger for hours to weeks. The UVOT is a joint product of Penn State and the Mullard Space Science Laboratory in England.

Swift detected bursts on March 18 and 19, as indicted in their names: GRB 050318 and GRB 050319. The UVOT team estimated that the redshifts are 1.44 and 3.24, respectively, which corresponds to distances of about 9.2 billion and 11.6 billion light years. (The second estimate reflects a more precise measurement made with the ground-based Nordic Optical Telescope.) Distance measurements are attained through analysis of the burst afterglow.

Swift has detected 24 bursts so far. GRB 050318 was the first burst in which the UVOT detected an afterglow. The lack of afterglow detection is interesting in its own right, Roming said, because it helps scientists understand why some bursts create certain kinds of afterglows, if any. For example, Swift's X-ray Telescope has detected afterglows from

several bursts. The UVOT detected afterglows in GRB 050318 and GRB 050319 in optical light, but not significantly in ultraviolet.

"Every burst is a little different, and when we add them all up we will begin to see the full picture," said Dr. Keith Mason, the U.K. UVOT Lead at University College London's Mullard Space Science Laboratory.

Mason said that UVOT distance measurements will become more precise in the upcoming months as new instruments aboard Swift are employed.

Swift is a medium-class explorer mission managed by NASA Goddard Space Flight Center in Greenbelt, Md. Swift is a NASA mission with participation of the Italian Space Agency and the Particle Physics and Astronomy Research Council in the United Kingdom. It was built in collaboration with national laboratories, universities and international partners, including Penn State; Los Alamos National Laboratory in New Mexico; Sonoma State University in California; the University of Leicester in Leicester, England; the Mullard Space Science Laboratory in Dorking, England; the Brera Observatory of the University of Milan in Italy; and the ASI Science Data Center in Rome, Italy.

More information about each of the Swift-detected gamma-ray bursts, updated every five minutes, is available on the web at: grb.sonoma.edu

Source: Penn State

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