Far UV detector is part of new instrument to be installed on Hubble

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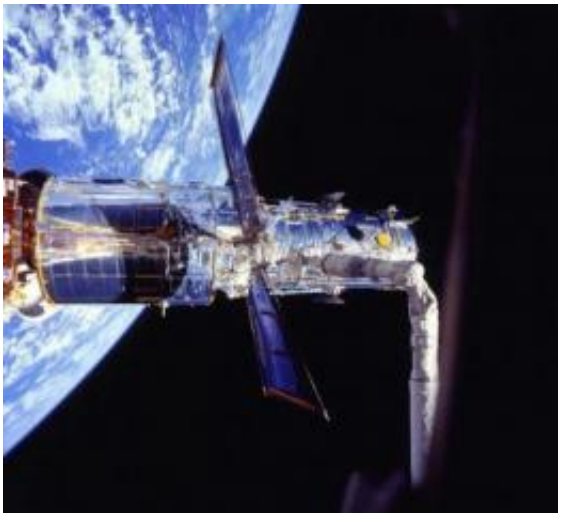

This is a photo of the Hubble Space Telescope. Credit: NASA

NASA's final mission to the 17-year-old Hubble Space Telescope, which begins May 11, will deliver a new instrument partly built by University of California, Berkeley, physicists to map the structure of the universe.

The Cosmic Origins Spectrograph (COS) contains both a far ultraviolet detector built at UC Berkeley's Space Sciences Laboratory and a near ultraviolet detector provided by Ball Aerospace & Technologies Corp. of Boulder, Colo. The spectrograph package was designed, assembled and readied for the Hubble Space Telescope by scientists at the University of Colorado, Boulder, under the leadership of the principal investigator

James Green, professor of astrophysical and planetary sciences and a former UC Berkeley graduate student.

COS is designed to explore the "cosmic web," a rarefied network of hot and ionized gas lanes connecting galaxies and dating from the early universe, according to Barry Welsh, a UC Berkeley astronomer who will be working with the new data from COS. By studying this web of hot gas, astronomers hope to detail the evolution of the large-scale structure of the universe seen today as walls and sheets of galaxies surrounding huge voids.

"The main goal of COS is to look as far and as faint as possible to study the cosmic web of primordial gas to understand how galaxies formed," Welsh said.

With COS, astronomers also will look for chemicals and hot winds in the haloes of distant galaxies. This information can provide important insight into how early galaxies grew and how rapidly galaxies accumulated heavy elements from exploding stars. Other astronomers, like Welsh, hope to use COS to explore the origin of stellar and planetary systems and the cold interstellar medium.

The Space Sciences Laboratory was subcontracted to build the far UV detector in 1998, with research physicist Oswald H.W. Siegmund as lead scientist. The detector was completed in 2002 and, except for a brief upgrade in 2003, has remained in a vacuum chamber at Goddard Spaceflight Center in Maryland awaiting its launch into space from Cape Kennedy on the Space Shuttle Atlantis.

"The far UV detector is similar to what we built for NASA's FUSE mission, but with better resolution and much better sensitivity," said Siegmund, referring to NASA's Far Ultraviolet Spectroscopic Explorer satellite, which was launched in 1999 to study the universe in the far UV

waveband. That mission, operated by Johns Hopkins University in Baltimore, ended in 2007.

During the upcoming 11-day servicing mission, NASA astronauts will deliver a second new instrument, the Wide Field Camera 3, and attempt to repair the Space Telescope Imaging Spectrograph (STIS) and the Advanced Camera for Surveys, which has provided scientists and the public with beautiful images of galaxies in the early universe. STIS had ultraviolet capabilities complementary to the COS and was used in conjunction with FUSE when both were operational. The STIS spectrograph failed due to an electronic short in August 2004.

Source: University of California - Berkeley