ESA to set tiny hair-like Webb Telescope microshutters

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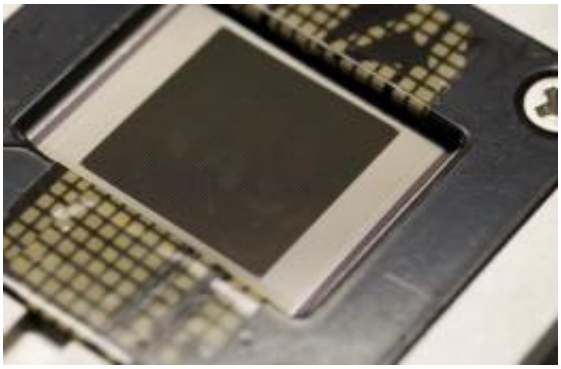


This is an array of microshutters, about the size of a postage stamp. Credit: NASA/Chris Gunn

Tiny little shutters as small as the width of a human hair are a key component in the James Webb Space Telescope's ability to see huge distances in the cosmos, and they have now arrived at the European Space Agency. Those little "shutters" are actually called "microshutters" and they are tiny doorways that focus the attention of the infrared camera on specific targets to the exclusion of others. They will focus in on objects like very distant stars and galaxies.

The microshutters were recently shipped from NASA's Goddard Space Flight Center in Greenbelt, Md. to the European Space Agency (ESA) for installation into the near-infrared spectrograph (NIRSpec) instrument. This is a big step, because the microshutters are components

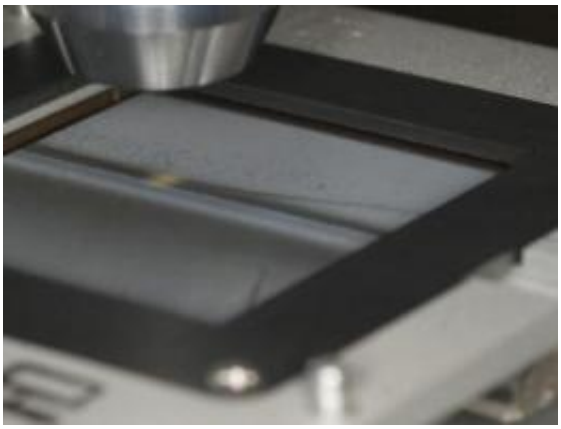
that will fly on the actual telescope.

Harvey Moseley, a Senior Astrophysicist at NASA Goddard, who led the microshutter team, said "This delivery is the culmination of nearly a decade of development, in which the device grew from an initial idea to a revolutionary system for vastly increasing the power of Webb telescope as it probes the distant universe. To have completed the development of this device in a space flight program speaks highly of the great team of engineers and technicians who brought this new technology to completion."

The microshutters are assembled as an "array" or collection. An array is a group of tiny microshutters that looks like a little square in a waffle-like grid. Each array or grid contains over 62,000 shutters. Individually, each microshutter measures 100 by 200 microns, or about the width of a human hair. The telescope will contain four of these waffle-looking grids all put together. They also have to work at the incredibly cold temperature of minus 388 degrees Fahrenheit (-233 degrees Celsius).

The microshutters will enable scientists to block unwanted light from objects closer to the camera in space, like light from stars in our Galaxy, letting the light from faraway objects shine through. To get an idea of how these tiny little "hairlike" shutters work, think about how a person raises their hand in front of their eyes to block the sunshine while trying to look at a traffic signal. Microshutters block excess light to see a dim object by blocking out brighter sources of light in the cosmos.

The microshutters were designed, built and tested at NASA's Goddard Space Flight Center in Greenbelt, Md. specifically for the James Webb Space Telescope. They are unique to the Webb telescope.



This photograph shows microshutters being examined with a microscope. A hair is visible in the picture for size comparison. Credit: NASA/Chris Gunn

They will work with the Near Infrared Spectrograph or NIRSpec. That instrument will break up the light from the galaxies into a rainbow of different colors, allowing scientists to determine the kinds of stars and gasses that make up the galaxies and measure their distances and motions. The microshutters help the NIRSpec to separate the light while observing up to 100 objects at the same time, because the microshutter system controls how light enters the NIRSpec.

Engineers at the European Space Agency at EADS/Astrium in Ottobrunn, Germany, a suburb of Munich will install the microshutters into the NIRSpec instrument. Once installed, ESA will conduct further testing on the entire instrument. Once those tests are complete and the NIRSpec is fully-functional and passes all tests, the NIRSpec will return to NASA Goddard to be placed on the main Webb telescope.

The telescope is a joint project of NASA, the European Space Agency and the Canadian Space Agency.

Provided by NASA's Goddard Space Flight Center