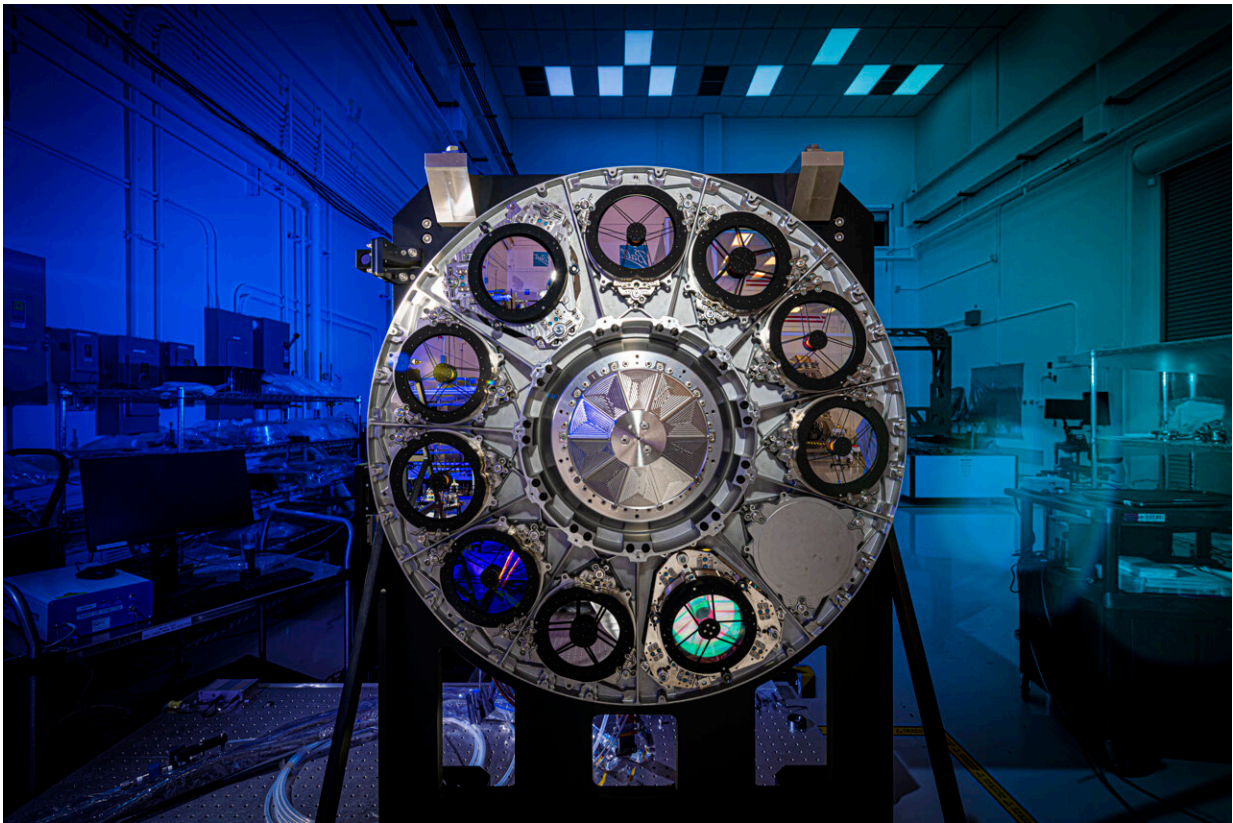


NASA's Roman mission completes key optical components

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Credit: Ball Aerospace

Engineers at Ball Aerospace, one of the industrial partners for NASA's Nancy Grace Roman Space Telescope, have installed and aligned the element wheel assembly (pictured above) into the telescope's Wide Field

Instrument. The assembly contains eight science filters, two dispersive elements (a grism and prism) and a "blank" element (used for internal calibration) that will help scientists solve some of the most profound mysteries in astrophysics when Roman launches by May 2027.

After light is reflected and focused by Roman's primary and secondary mirrors, it will pass through the element wheel. The focused and filtered light will then reach a large detector array, where an image is created. Depending on what the researchers are looking for, the science filters will allow astronomers to select specific wavelengths of light for their observations.

The grism and prism are tools for spectroscopy, designed to spread out the light from cosmic objects into different colors. These rainbow-like measurements, called spectra, contain unique signatures about the sources that offer clues about their nature.

For example, [astronomers](#) will be able to measure how thousands of entire galaxies are moving through [space](#), which will help them see how fast the universe has expanded at different points in time. Doing so can help pin down the nature of dark energy—the mysterious cosmic pressure that's speeding up the universe's expansion.

The grism and prism were fabricated and tested by Optimax, Jenoptik, and NASA's Goddard Space Flight Center to ensure they meet Roman's stringent requirements. The team simulated space-like conditions in a cryo-vacuum vessel, which lowered the temperature to about minus 190 degrees Fahrenheit (minus 123 degrees Celsius). Since most materials expand when heated and compress when cooled, engineers had to confirm that the optics will work as planned at Roman's super-cold operating temperature.

Both the grism and [prism](#) passed, with test images showing minimal

distortion. Astronomers will use these components to explore some of the biggest mysteries in the universe.

Provided by NASA's Goddard Space Flight Center

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