

# 2400 new eyes on the sky to see cosmic rainbows

November 11 2022

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The new instrument for capturing cosmic rainbows mounted on the top of the Subaru Telescope. Credit: Kavli IPMU

The Subaru Telescope successfully demonstrated engineering first light with a new instrument that will use about 2400 fiberoptic cables to

capture the light from heavenly objects. Full operation is scheduled to start around 2024. The ability to observe thousands of objects simultaneously will provide unprecedented amounts of data to fuel Big Data Astronomy in the coming decade.

In addition to cameras, astronomers also use instruments known as spectrographs to study celestial object. A spectrograph breaks the light from an object into its component colors, in other words it creates a precise rainbow. Studying the strengths of the different colors in the rainbow from an object can tell astronomers various details about the object such as its motion, temperature, and chemical composition.

This new instrument, called PFS (Prime Focus Spectrograph), breaks visible light rainbows into two components: the red side and the blue side. So it might be more correct to refer to the data sets as half-rainbows. Combined with a third kind of detector which can see the [infrared light](#) invisible to humans, that makes one-and-a-half rainbows for an object studied with all three types of detectors.

Together with a widefield camera (HSC: Hyper Suprime-Cam), PFS will help launch the Subaru Telescope 2.0 project which will reveal the nature of dark matter and [dark energy](#), structure formation in the Universe, and the physical processes of galaxy formation and evolution.

Provided by National Institutes of Natural Sciences

Citation: 2400 new eyes on the sky to see cosmic rainbows (2022, November 11) retrieved 19 April 2024 from <https://phys.org/news/2022-11-eyes-sky-cosmic-rainbows.html>

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