

Video: Closer than ever: Solar Orbiter's first views of the sun

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The first images from ESA's Solar Orbiter are already exceeding expectations and revealing interesting new phenomena on the sun.

This animation combines a series of views captured with several remote-sensing instruments on Solar Orbiter between 30 May and 21 June 2020, when the spacecraft was roughly halfway between the Earth and the sun—closer to the sun than any other solar telescope has ever been before.

The red and yellow images were taken with the Extreme Ultraviolet Imager (EUI) in the extreme ultraviolet region of the electromagnetic spectrum, at wavelengths of 30 and 17 nanometers, respectively.

The close-up views by EUI show the upper atmosphere of the sun, or corona, with a temperature of around 1 million degrees. With the power to see features in the solar corona of only 400 km across, these images reveal a multitude of small flaring loops, erupting bright spots and dark, moving fibrils. A ubiquitous feature of the solar surface, uncovered for the first time by these images, have been called 'campfires'. They are omnipresent minature eruptions that could be contributing to the high temperatures of the solar corona and the origin of the solar wind.

The EUI images are followed by three views based on data from the Polarimetric and Helioseismic Imager (PHI) instrument. The blue and red view is a 'tachogram' of the sun, showing the line of sight velocity of the sun, with the blue side turning to us and the red side turning away.

The following view is a magnetogram, or a map of magnetic properties for the whole sun, featuring a large magnetically active region in the lower right-hand quadrant of the sun. The yellow-orange view is a [visible light](#) image and represents what we would see with the naked eye: there are no sunspots visible because the sun is displaying only low levels of magnetic activity at the moment.

On larger scales, the Metis coronagraph blocks out the dazzling light from the solar surface, bringing the fainter corona into view. Metis observes the corona simultaneously in visible light (shown in green) and [ultraviolet light](#) (shown in red) for the first time with unprecedented temporal coverage and spatial resolution. These images reveal the two bright equatorial streamers and fainter polar regions that are characteristic of the [solar corona](#) during times of minimal magnetic activity.

On even grander scales, the Heliospheric Imager (SoloHI) telescope takes images of the solar wind—the stream of charged particles constantly released by the sun into outer space—by capturing the light scattered by electrons in the wind. The first-light image from SoloHI is shown at the end, as a mosaic of four separate images from the instrument's four separate detectors. In this view, the sun is located to the right of the frame, and its light is blocked by a series of baffles; the last baffle is in the field of view on the right-hand side and is illuminated by reflections from the solar array. The partial ellipse visible on the right is the zodiacal light, created by sunlight reflecting off the dust particles that are orbiting the sun. The signal from the solar wind outflow is faint compared to the much brighter zodiacal light signal, but the SoloHI team has developed techniques to reveal it. Planet Mercury is also visible as a small bright dot near the lower edge of the upper left tile.

Provided by European Space Agency

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