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Astronomy

JWST snaps its first Mars pics

As well as staring deep into the cosmos, James Webb can look closer to home

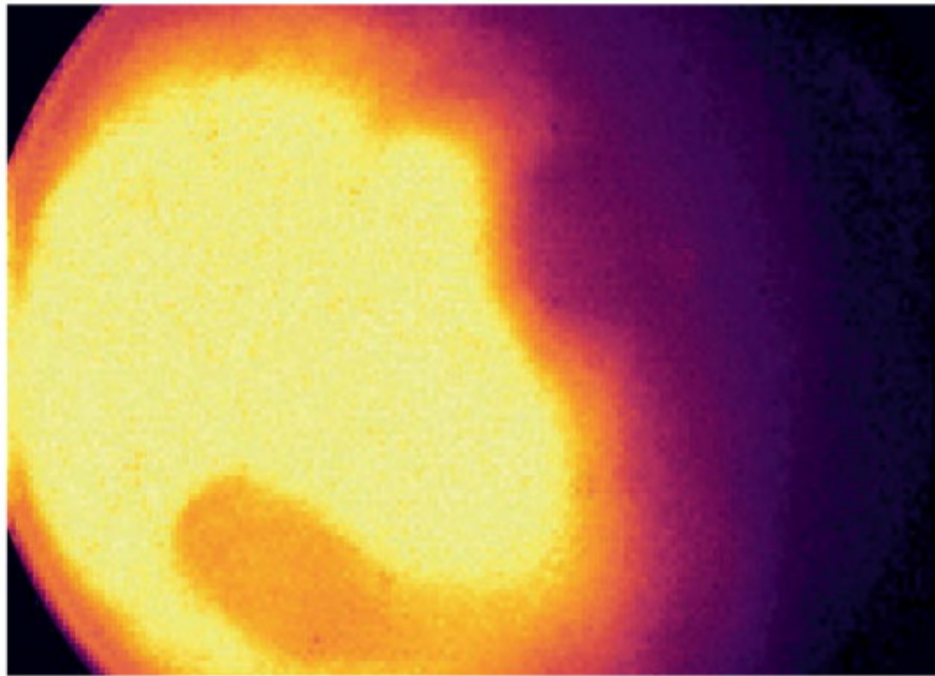
Alex Wilkins

THE James Webb Space Telescope (JWST) has released its first images of Mars, capturing atmospheric data for the entire planet that will help astronomers identify phenomena and gases that previous instruments couldn't.

"Now you can actually get these full images of the planet in the whole infrared range at incredible sensitivities," says Geronimo Villanueva at the NASA Goddard Space Flight Center in Maryland.

This image shows the eastern hemisphere of Mars in infrared, revealing information about heat emitted from the Martian surface and atmosphere (brighter is hotter), as well as the levels of carbon dioxide in the atmosphere.

Imaging close planets like Mars is difficult for an instrument like JWST, which was designed to detect very distant, faint objects. The sunlight reflected from Mars overloads JWST's detectors, so Villanueva and his team had to adapt by taking short exposures



NASA/ESA/CSA/STC/MARS JWST/GTO TEAM

and only sampling some of the light from the detectors.

Mars was especially tricky to capture because it moves relatively quickly around the solar system, whereas JWST typically images objects that barely move relative to other stars. "The fact that, when we opened

the images and when we got the spectra, we actually could get the data and they were good data, it was exciting," says team member Sara Faggi.

The first images and spectra of Mars from JWST haven't revealed anything we didn't already know about the planet, identifying dust,

The planet Mars seen in infrared by the JWST telescope

surface rocks and atmospheric features like water and carbon dioxide, but they do serve as a proof of concept for collecting data that other telescopes can't.

One advantage of using JWST to look at Mars is that an entire face of the planet can be imaged at once in high resolution at a short exposure time, which should allow for the study of events that happen over a short timescale, like dust storms, weather patterns and seasonal changes.

This full picture will also allow scientists to more easily track down the sources of any trace gases that they spot. "Hunting for these particular [chemical] species and, eventually, identifying the sources of these species is a work that can be done in a much more promising way with JWST," says team member Giuliano Liuzzi. ■

Coronavirus

Omicron variant may protect against flu

BEING infected with the omicron variant of the coronavirus may give some protection against flu.

Martin Michaelis at the University of Kent in the UK and his colleagues collected bronchial cells from a person with emphysema, a condition where the lungs' air sacs are damaged, but the bronchi airways are unaffected.

The cells were extracted as part of a standard diagnostic or treatment procedure. With the bronchi being unaffected by emphysema, the results are expected to apply to people

without the condition, according to Michaelis.

In a laboratory study, the bronchial cells were infected with the delta variant of the SARS-CoV-2 coronavirus or one of two omicron subvariants, BA.1 or BA.5. As a control, the researchers treated some cells with a saline solution.

After two days, the team exposed all the cells to the H1N1 strain of influenza virus, which circulates every winter.

One day later, the researchers measured the H1N1 levels in all the cells. In the control cells and those infected with the delta variant, H1N1 levels increased roughly 10,000-fold (bioRxiv, doi.org/jc2b). This is compared with no increase in the cells that

contained either omicron subvariant.

The team also found that the cells containing the omicron subvariants produced a protective immune response called the interferon response, which is known to reduce the replication of flu viruses. Among the control cells and those infected with the delta variant, this response was much lower and insufficient to suppress H1N1 replication.

The findings may be reflective of changing SARS-CoV-2 and flu infection rates over the pandemic. "Following the lifting of restrictions in July 2021 in England, we saw a

"We don't advise people to purposely get infected with covid-19 to protect against influenza"

delta wave accompanied by an increase in influenza-like illnesses," says Michaelis. "But then, since omicron BA.1 became dominant, influenza-like illnesses dropped and have stayed low."

However, this could be due to people being more careful to avoid infections during winter, he says.

Understanding how covid-19 variants trigger varying immune responses may help researchers more quickly understand the potential impact of new variants.

"We, of course, don't advise people to purposely get infected with covid-19 to protect against influenza. With SARS-CoV-2 infection, there's always a chance you could die," says Michaelis. ■
Carissa Wong