SCIENCE & TECHNOLOGY

Green Glow Spotted for First Time Around Mars

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A European spacecraft has discovered a green **glow** of oxygen in the atmosphere surrounding Mars. It is the first time this bright green light has been seen around any planet besides Earth.

The spacecraft is called the ExoMars Trace Gas Orbiter. It is operated by the European Space Agency (ESA) and Russia's space agency.

The orbiter, which launched in 2016, is equipped with instruments designed to search for the presence of methane and other gases in the Martian atmosphere. Such gases could provide evidence of any biological or **geological** activity around Mars.

The instruments were developed by scientists at the Royal Belgian Institute for Space Aeronomy. The findings were recently published in a study in *Nature Astronomy*.

On Earth, glowing oxygen is produced when energetic electrons from space hit the upper atmosphere. These naturally appearing lights - known as the polar **auroras** - create a bright, green glow.

Earth's green glow has been seen and captured in images by astronauts aboard the International Space Station (ISS). Now, for the first time, the same green glow has been observed in the atmosphere of Mars.

Jean-Claude Gérard of the University of Liège in Belgium helped lead the research. He said the discovery is important because this green glow had never been seen around any other planet. "This **emission** has been predicted to exist at Mars for around 40 years – and, thanks to (ExoMars), we've found it."

In a statement announcing the findings, the ESA noted that in addition to light caused by auroras, the atmosphere of planets like Earth and Mars have a continuous glow, both day and night. This is caused by sunlight interacting with atoms and molecules within the atmosphere.

Researchers explained that there are two likely reasons the green glow had not been observed in the atmospheres of other planets before. Either the planet surfaces were too bright to permit the light to be seen, or earlier space missions were not equipped with instruments sensitive enough to observe the glow.

To try to overcome this issue, the scientists running the orbiter's experiments decided to change the positioning of the spacecraft's observation instruments.

The usual positioning of the instruments was pointed directly down at the Martian surface. This time, though, the equipment was pointed in the direction of the "edge" of Mars in an effort to search for the daytime emission of oxygen.

The researchers said pointing the instruments in this direction provided a similar position to images of the green glow captured by astronauts looking at Earth from the space station.

Ann Carine Vandaele is a researcher at the Royal Belgian Institute for Space Aeronomy and a co-writer of the study. She reported the experiments were carried out between April and December 2019. During this time, the orbiter captured **scans** ranging from 20 to 400 kilometers from the Marian surface twice per orbit.

Examinations of the scans found the green oxygen emission in all of them. "The emission was strongest at an **altitude** of around 80 kilometers and varied depending on the changing distance between Mars and the sun," Vandaele said in a statement.

Another researcher, José Juan López-Moreno, is with the Institute of Astrophysics of Andalusia in Granada, Spain. He said the discovery "opens a window for the study of the behavior and **photochemistry** of this planet." He added that the study provides a valuable tool to help scientists understand the interaction of solar radiation with the Mars atmosphere.

Miguel Ángel López-Valverde is also a researcher at the Spanish institute who took part in the study. He said the research "may be of great interest for studying the atmospheres of planets in other solar systems and searching for signs of life."

Researchers also noted that such experiments can help uncover details about the Mars atmosphere that can be used to plan and launch future **missions** to the planet.

I'm Bryan Lynn.

Bryan Lynn wrote this story for VOA Learning English, based on reports from the European Space Agency, the Royal Belgian Institute for Space Aeronomy and the Institute of Astrophysics of Andalusia. Hai Do was the editor.

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Words in This Story

glow – *n.* a soft, warm light

geology – *n.* the study of rocks and soil and the physical structure of the Earth

aurora – *n.* streamers or arches of light appearing in the upper atmosphere of a planet's magnetic polar regions caused emission of light from atoms

emission – *n.* the act of sending gas, heat or light out into the air

scan – *n.* the act of scanning, or looking at all part of something

altitude – *n.* the height of something above sea level

photochemistry – *n.* a part of chemistry that deals with the chemical effects of light

mission – *n.* an important task, usually involving travel somewhere