

Thaxted Astronomical Society

News

Features

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Scientists Untangle

Mystery Off Ice On Mercury

<https://www.dailymail.co.uk/sciencetech/article-8118431/Scientists-untangle-mystery-ice-forms-Mercury-surface-temperatures-750-degrees.html>

Scientists untangle the mystery of how ice formed on Mercury in spite of surface temperatures as hot as 750 degrees Fahrenheit

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- Researchers at Georgia Tech investigate how ice forms on Mercury
- Most of the ice on the planet's poles is believed to have come from asteroids
- However, some of that ice likely formed when compounds in the planet's soil are heated by heavy solar radiation, releasing hydrogen and water
- The hydrogen and water molecules are driven to the poles where they reform as ice in deep craters shielded from direct sunlight

A team of scientists from Georgia Tech have come up with a new explanation for how ice forms on Mercury despite scorching surface temperatures that can reach 750 degrees Fahrenheit.

According to the theory, chemicals in the planet's surface are heated by intense solar radiation, releasing water and hydrogen that can later resettle in deep craters shielded from the sun, where the water transforms to ice.

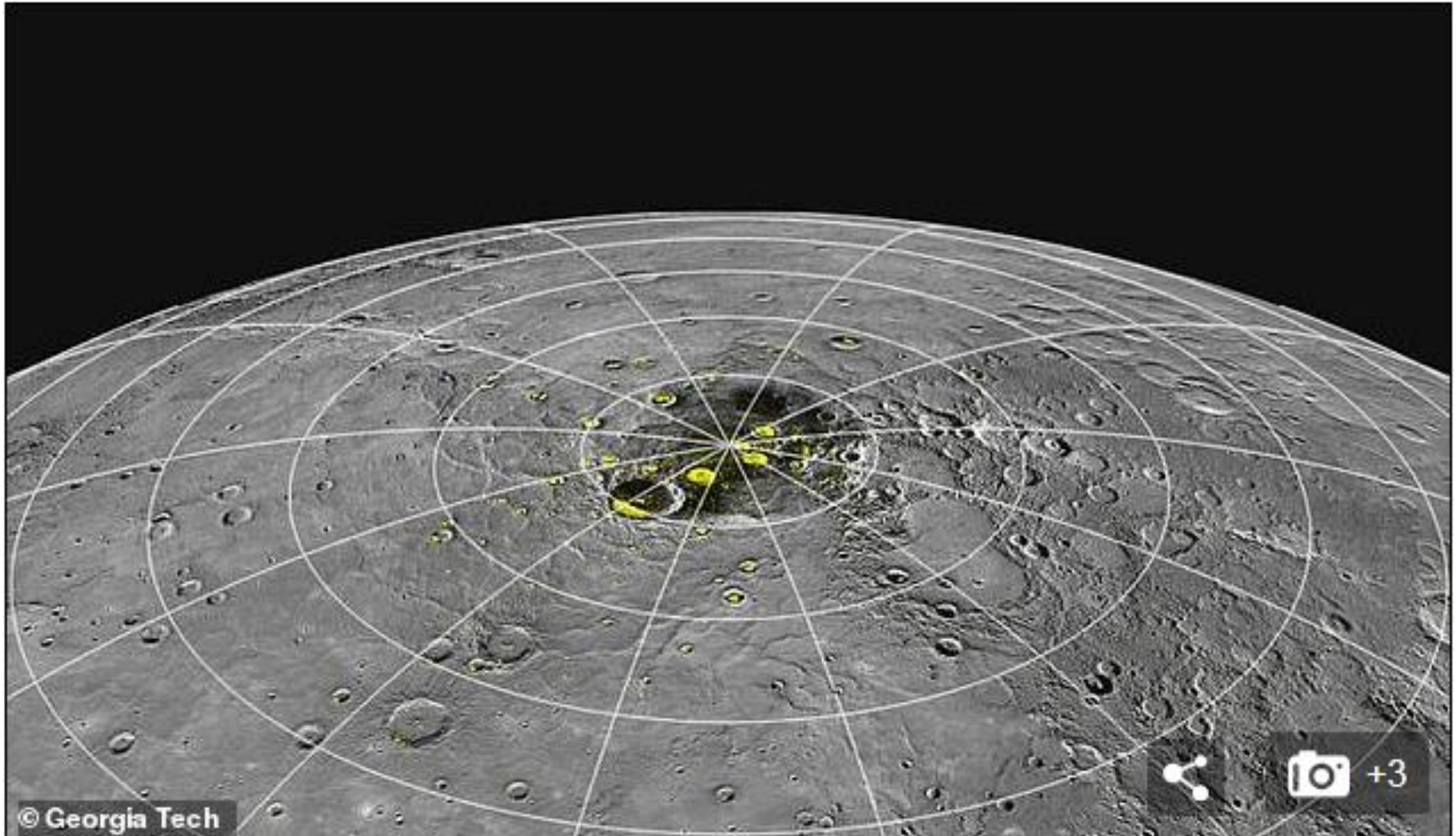
The frozen substance was originally discovered in 2011 by NASA's Messenger probe, which was the first spacecraft to orbit the planet.

Radar images taken by Messenger showed large pockets of ice embedded in craters all over both of Mercury's poles.

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A team of scientists from Georgia Tech have developed an explanation for how ice forms on the surface of Mercury, by the sun heating hydroxyl compounds in the soil, causing hydrogen and water to be released and travel to the poles where it reforms as ice in shaded craters

The discovery was a major surprise given that the planet is the closest to the sun in our solar system, with surface temperatures that climb as high as 750 degrees Fahrenheit .

The original theory is that ice arrived on asteroids, which crashed into the planet's surface, created craters deep enough to shield the ice from direct exposure to the sun

Because Mercury has no atmosphere, its surface temperature plummets when not directly exposed to sunlight, dropping as low as minus-280 degrees Fahrenheit.

While about 90 percent of the planet's ice is believed to have come from asteroids, 10 percent formed through natural processes on the planet and a team of researchers from Georgia Tech's Center for Space Technology and Research have an new explanation for how that happened.

The soil on Mercury contains a variety of hydroxyl groups, which, when heated by solar radiation begin to slam into each other in a process that releases both water molecules and hydrogen

The water and hydrogen are lifted out of the ground soil and some groups of molecules travel as far as the poles where they settle to the surface and form ice deposits in craters where they're not exposed to the sun

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'It's a little like the song Hotel California,' Georgia Tech's Thomas Orlando told Eurekalert. 'The water molecules can check in to the shadows but they can never leave.'

The mechanics of hydroxyl compounds has long been understood, but the Georgia Tech team believe their work shows how those mechanisms would work on Mercury

'This is not some strange, out of left field idea,' Georgia Tech's Brant Jones said.

'The basic chemical mechanism has been observed dozens of times in studies since the late 1960s. But that was on well-defined surfaces.'

'Applying that chemistry to complicated surfaces like those on a planet is groundbreaking research.'

The team estimates that through the hydroxyl transformation process, more than 11 billion tons of ice could have formed on the planet over 3 million years.

The team believes this process could also help explain how ice might potentially form on an asteroid.

'Processes like these could have helped make it,' Jones said.