

## 《月球稀薄的大气层可能是由微陨石不断撞击形成》

Scientists say new examinations of soil collected on the moon suggest its atmosphere might have been created by repeated meteorite strikes.

科学家表示，对月球上所收集土壤的新检测表明，月球的大气层可能由陨石反复撞击产生。



Researchers studying the moon first used instruments to confirm it had an atmosphere in the early 1970s.

研究月球的研究人员在20世纪70年代初首次使用仪器确认月球有大气层。

The American space agency NASA explains the moon's atmosphere is "very thin and weak".

美国航天机构NASA解释称，月球的大气层“非常稀薄和脆弱”。

It is technically considered an "exosphere".

按照事实，它被认为是“外逸层”。

The newly examined soil was collected by NASA astronauts during America's Apollo program from 1969 to 1972.

新检测的土壤是美国宇航局(NASA)宇航员在1969年至1972年的美国阿波罗计划期间收集。

The trips resulted in astronauts capturing about 382 kilograms of rocks and soil, called samples.

那次航天之旅使宇航员获得约382公斤被称为样本的岩石和土壤。

Instead of attempting to measure the moon's atmosphere in a direct way, investigators looked to the old soil material.

研究人员没有试图以直接的方式测量月球的大气，而是研究了古老的土壤物质。

They theorized that the soil should contain residue material from atoms released into the lunar atmosphere over billions of years.

他们推理，月球土壤应该含有数十亿年来释放到月球大气中的原子残余物质。

The research was led by scientists at the University of Chicago and Massachusetts Institute of Technology (MIT).

该研究由芝加哥大学和麻省理工学院(MIT)的科学家领导。

Their results recently appeared in a study in the publication Science Advances.

他们的研究结果最近出现在《科学进展》杂志上的一项研究中。

Nicole Nie was the lead writer of the study.

尼科尔·聂是该研究的主要作者。

She is a planetary scientist at MIT.

她是麻省理工学院的一名行星科学家。

Nie said that when meteorites impact, or hit, an object like the moon, they create very high temperatures.

聂说，当撞击或碰撞月球等物体时，陨石会产生非常高的温度。

Such strikes can heat up the surface by 2,000 to 6,000 degrees Celsius.

这样的撞击可以使表面升温2000到6000摄氏度。

These extreme temperatures melt and vaporize rocks at the surface and release atoms contained in dust and soil into the atmosphere.

这种极端温度使表面的岩石融化和蒸发，并将灰尘和土壤中所含的原子释放到大气中。

Some of the atoms end up being pushed into space, while others remain just above the surface.

一些原子最终被推入太空，而另一些原子则留在地表之上。

The researchers said the soil examinations led to the discovery that the moon's atmosphere was formed through a process known as "impact vaporization".

研究人员表示，对月球土壤的检测让人们发现，月球的大气层是通过一个被称为“碰撞蒸发”的过程形成。

Nie and her team centered their examinations on two main elements - potassium and rubidium.

聂及其团队将检测集中在两种主要元素上——钾和铷。

These substances were chosen because they can easily be vaporized by meteorite hits.

之所以选择这些物质是因为它们很容易被陨石撞击而蒸发。

The process involved studying the behaviors of different kinds of isotopes found in potassium and rubidium.

这个过程涉及研究在钾和铷中发现的不同同位素的性能。

That study persuaded the team that repeated meteorite strikes formed the atmosphere.

这项研究让该研究小组相信，反复的陨石撞击形成了月球大气层。

In the past, studies have shown the moon's atmosphere might have been created by either meteor activity or the solar wind.

过去，研究表明月球大气层可能是由流星活动或太阳风造成。

Solar wind describes a continuous flow of charged particles from the sun that spreads across the solar system.

太阳风描述的是来自太阳的连续带电粒子流，它在太阳系中传播。

The researchers said the latest study provides new evidence that most of the lunar

atmosphere was likely formed by repeated meteorite hits over billions of years.

研究人员表示，这项最新研究提供了新的证据，证明大部分月球大气可能由数十亿年来反复的陨石撞击形成。

After testing 10 samples of lunar soil, the team concluded that much more of the atmosphere is due to meteor activity than to the solar wind.

在测试了10个月球土壤样本后，该研究小组得出结论，月球大气层更多地是由流星活动造成，而不是太阳风造成。

"At least 70 percent of the lunar atmosphere is created by these meteorite impacts," Nie said in a statement.

“至少70%的月球大气由这些陨石撞击造成，”聂在一份报告中说。

"A much smaller percentage is created by the solar wind abrasion of the surface," she added.

“太阳风对月球表面磨蚀造成的月球大气比例要小得多，”她补充道。

Nicolas Dauphas is a professor of geophysical sciences at the University of Chicago.

尼古拉斯·道法斯是芝加哥大学地球物理学教授。

He helped lead the research.

他帮助领导了这项研究。

Dauphas said, "It turns out the answer to this longstanding question was right in front of us - preserved in lunar soil brought back to Earth by the Apollo missions."

道法斯说：“事实证明，这个长期存在的问题的答案就在我们面前——保存在阿波罗任务带回地球的月球土壤中。”

Nie said understanding such processes can be extremely valuable to planning future missions to the moon, Mars and beyond.

聂说，了解这些过程对规划未来的月球、火星等和更远距离的任务非常有价值。

"If humans want to move to different planetary bodies someday, we will have to understand what's going on at the surface to be able to prepare."

“如果有一天人类想要搬到不同的行星体上，我们就必须了解这些行星表面发生了什么，才能够做好准备。”

She added, "Each planetary body is different, and the more we understand about these processes, the more complete picture we'll have."

她补充说：“每个行星体都是不同的，我们对这些过程了解得越多，我们就会有越全面的了解。”

I'm Bryan Lynn.

布莱恩·林恩为您播报。

## 重点词汇

on the moon 在月球上；在月亮上；月亮上；月亮之上

might have been 可能是；或许；可能会；有可能当；可能曾是；也许本来是

meteorite 陨石

世纪 century ; times ; c

The American 美国人；一个美国人；美国刺客

space agency 航天局；宇航局；太空总署；美国太空总署

very thin 非常薄的；非常瘦的；非常稀的

exosphere 外层，外逸层

Apollo program 阿波罗计划；登月计划；阿波罗计画；阿波罗登月计划

Instead of 而不是；代替，作为……的替换