**Black Holes Merge Into Unusual Size**

**黑洞碰撞融合成超大黑洞**

Black holes are becoming stranger — even to scientists who study planets and other objects in outer space.

黑洞变得越来越陌生，甚至对于研究外太空行星和其他物体的科学家来说也是如此。

Astronomers recently reported the discovery of the signal from a violent collision of two black holes. The event, which took place long ago, created a new black hole of a size that scientists had never seen before.

最近天文学家报告称发现两个黑洞剧烈碰撞的信号。这一发生在很久以前的事件创造了一个新的黑洞，而它的尺寸对科学家们来说是前所未见的。

California Institute of Technology physicist Alan Weinstein was part of the discovery team. He noted that the finding was the “biggest bang” ever observed by human beings since the Big Bang.

加州理工学院物理学家艾伦·韦恩斯坦是研究出这一发现的小组的一员。他指出，这一发现是大爆炸以来人类观测到的“最大爆炸”。

The Big Bang is a term many astronomers use to explain the beginning of the universe.

宇宙大爆炸是许多天文学家用来解释宇宙起源的一个术语。

Black holes are compact areas of space. They are so dense that not even light can escape. Until recently, astronomers had observed them in two general sizes.

黑洞是紧凑的空间形态。由于过于密集，连光都无法穿透。直到最近天文学家才观察到两个普通大小的黑洞。

There are “small” ones called stellar black holes. These black holes are formed when a star collapses. They are about the size of a small city.

较“小”的黑洞被称为恒星黑洞。这类黑洞是恒星解体时形成的，体积大小约等于一个小城市。

There are also supermassive black holes. These black holes are millions, maybe billions, of times more massive than our sun.

也有超大质量的黑洞。这类黑洞的质量比我们的太阳大数百万倍，甚至几十亿倍。

Astronomers’ calculations suggest that anything in between the two sizes did not make sense. That was because stars that grew too big before collapse would generally destroy themselves, leaving no black holes.

天文学家的计算表明，这两种尺寸之间不可能存在中间值。因为在解体前变得太大的恒星通常会自我毁灭而不会留下黑洞。

Nelson Christensen is research director of the French National Centre for Scientific Research. He says scientists thought that star collapses could not create stellar black holes much bigger than 70 times the mass of our sun.

尼尔森·克里斯滕森是法国国家科学研究中心的研究主任。他表示，科学家们认为恒星解体不会产生比太阳质量大70倍的恒星黑洞。

Then in May 2019 two sensors received a signal that turned out to be the energy from two stellar black holes crashing into each other. One was 66 times the mass of our sun. The other was 85 times the mass of the sun.

然后在2019年5月，两个传感器接收到一个两个恒星黑洞相撞产生的能量发出的信号。其中一个是太阳质量的66倍。另一个是太阳质量的85倍。

The result: The first ever discovered intermediate black hole, at 142 times the mass of the sun. The word intermediate suggests being in the middle of a process or development.

结果产生了有史以来第一个被发现的中级黑洞——质量约是太阳的142倍。中级表示它处于发展的过程中。

In the collision, a large amount of energy was lost. The energy was in the form of a gravitational wave, a ripple in space that travels at the speed of light.

碰撞中损失了大量能量。这些能量变成引力波——太空中以光速传播的一波涟漪。

It was that wave that physicists in the United States and Europe, using detectors called LIGO and Virgo, captured last year. After studying the signal and reexamining their work, scientists published the results this week in Physical Review Letters and Astrophysical Journal Letters.

去年，美国和欧洲的物理学家利用“激光干涉引力波天文台”和Virgo天文台探测器捕捉到了这一引力波。在研究了该信号并对其进行反复检验之后，科学家们本周在《物理评论快报》和《天体物理学杂志快报》上发表了研究结果。

Because the detectors receive the gravitational waves as audio signals, scientists actually heard the collision. For all the violence, the signal lasted only one-tenth of a second.

由于探测器接收到的引力波是声波信号，因此科学家们真切地听到了碰撞的声音。整个碰撞过程发出的信号只持续了十分之一秒。

“It just sounds like a thud,” Weinstein said. “It really doesn’t sound like much on a speaker.”

韦恩斯坦表示：“听起来像是‘砰’的一声。并不像是扬声器发出的声音。”

This crash happened about 7 billion years ago, when the universe was about half its current age. It was only detected now because the collision was so far away.

这次撞击发生在约70亿年前，当时宇宙的年龄只有现在的一半。它之所以现在才被发现，是因为碰撞发生的太过遥远。

Black hole collisions have been observed before. But the black holes involved were smaller to begin with. Even after the collision, they did not grow beyond the size of normal stellar black holes.

以前科学家们也观察到过黑洞碰撞，但那些黑洞体积更小。即使在碰撞发生之后，它们的尺寸也没有超过正常恒星黑洞的大小。

Scientists still do not know how supermassive black holes at the center of galaxies formed, Christensen said, but this new discovery may offer a clue.

克里斯滕森表示，科学家仍然不知道星系中心的超大质量黑洞是如何形成的，但这一新发现或许能提供一些线索。

I'm John Russell.

约翰·拉塞尔报道。

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