**Three Scientists Win Nobel Physics Prize for Black Hole Research**

**三位研究黑洞的科学家获诺贝尔物理学奖**

Three scientists have won the 2020 Nobel Prize in physics for their discoveries related to massive objects called black holes.

三位科学家凭借研究超大质量物体——黑洞的研究成果获得2020年诺贝尔物理学奖。

The Royal Swedish Academy of Science said Tuesday it will give half of the $1.1 million prize to Roger Penrose of Britain’s University of Oxford. It is recognizing his use of mathematics to prove that black holes are a direct result of “Albert Einstein’s general theory of relativity.”

瑞典皇家科学院周二表示，将把110万美元奖金的一半颁给英国牛津大学的罗杰·彭罗斯，用以表彰他用数学运算证明黑洞是“爱因斯坦广义相对论”的直接结果。

Germany’s Reinhard Genzel and Andrea Ghez of the United States will share the other half of the physics prize. Genzel works at both the Max Planck Institute in Germany and the University of California, Berkeley. Ghez is a professor in the Department of Physics and Astronomy with the University of California, Los Angeles.

德国的莱因哈德·根泽尔和美国的安德烈·盖兹将分享另一半物理学奖金。根泽尔同时为德国马克斯普朗克研究所和加州大学伯克利分校工作。盖兹是加州大学洛杉矶分校物理和天文学系的教授。

The academy is recognizing the two scientists “for the discovery of a supermassive compact object at the center of our galaxy.” That object was a large black hole.

科学院表彰这两位科学家“在银河系中心发现一个超大质量的致密天体”，而这个天体是一个巨大的黑洞。

What are black holes?

什么是黑洞?

The physics prize celebrates what the Nobel Committee called “one of the most exotic objects in the universe.”

今年的物理学奖颁给了诺贝尔委员会称之为“宇宙中最奇异的物体之一”。

Black holes might exist at the center of every galaxy. Galaxies are huge systems that contain billions of stars. Smaller black holes can be found around the universe. Nothing, not even light, can escape their gravity. Time comes to a halt as it gets closer.

黑洞可能存在于每个星系的中心。而星系是包含数十亿颗恒星的巨大系统。宇宙中能发现较小的黑洞。包括光在内的任何东西都无法逃脱黑洞的引力，就连时间不断接近黑洞也会停止。

“Black holes, because they are so hard to understand, is what makes them so appealing,” Ghez told The Associated Press. “I really think of science as a big, giant puzzle.”

盖兹告诉美联社：“正是因为黑洞太难理解了，它才如此吸引人。我坚信科学就是一个巨大的难题。”

“You get this mixing of space and time,” she said, adding that is what makes black holes so hard to understand.

“黑洞使我们看到了空间和时间的混合，”她还补充说，这正是黑洞如此难以理解的原因。

Penrose proved with math that the formation of black holes was possible. His work was based heavily on Einstein’s general theory of relativity.

彭罗斯用数学证明了黑洞的形成是可能的。他的工作主要基于爱因斯坦的广义相对论。

“Einstein did not himself believe that black holes really exist, these super-heavyweight monsters that capture everything that enters them,” the Nobel Committee said. “Nothing can escape, not even light.”

诺贝尔委员会表示：“爱因斯坦本人并不相信黑洞真的存在，这些超重量级的怪物能吸收进入里面的一切。什么都逃不掉，光也不行。”

British astronomer Martin Rees noted that Penrose’s work fueled a “renaissance” in the study of relativity in the 1960s. He added that Penrose, together with a young Stephen Hawking, helped support evidence for the Big Bang and black holes.

英国天文学家马丁·里斯指出，彭罗斯的工作推动了20世纪60年代相对论研究的“复兴”。他还补充道，彭罗斯和年轻版的斯蒂芬·霍金一起为大爆炸和黑洞提供了支持性的证据。

“Penrose and Hawking are the two individuals who have done more than anyone else since Einstein to deepen our knowledge of gravity,” Rees said.

里斯说：“彭罗斯和霍金是继爱因斯坦之后，在深化我们对引力的认识方面做得最多的人。”

Nobel prizes are only awarded to the living. Hawking died in 2018.

诺贝尔奖只授予在世的科学家。霍金于2018年去世。

Finding ‘an extremely heavy, invisible object’

发现“一个质量极大却又看不见的物体”。

In the 1990s, Genzel and Ghez were each leading a group of astronomers. Both groups were interested in the center of our Milky Way galaxy. They both found that there was “an extremely heavy, invisible object” that pulls other stars, causing them to move around at high speeds, the committee said.

上世纪90年代，根泽尔和盖兹各自领导着一个天文学家小组。两组人都对我们银河系的中心很感兴趣。委员会称：他们都发现有一个“非常重但又不可视的物体”拉动着其他恒星，使它们高速移动。

It was a supermassive black hole 4 million times the mass of our sun.

这是一个质量是太阳质量400万倍的超大质量黑洞。

The first picture Ghez got of the object was in 1995. The image came from telescopes at the W.M. Keck Observatory, which had just gone online. A year later, another picture appeared to show that the stars near the center of the Milky Way were moving around something. A third picture led Ghez and Genzel to think they had discovered something.

盖兹拍到第一张照片是在1995年。这张图片来自刚刚上线的凯克天文台的望远镜。一年后，另一张图片显示银河系中心附近的恒星在围绕某个物体移动。第三张照片使得盖兹和根泽尔相信他们发现了黑洞。

Now scientists know that all galaxies have supermassive black holes.

现在科学家们知道了所有星系里都有超大质量的黑洞。

“Today we accept these objects are critical to the building blocks of the universe,” Ghez said.

盖兹说：“今天我们认识到这些天体是宇宙构成的关键。”

Ghez is the fourth woman to be awarded the Nobel Prize for physics. The others were Marie Curie in 1903, Maria Goeppert-Mayer in 1963, and Donna Strickland in 2018.

盖兹是第四位获得诺贝尔物理学奖的女性。其他三人分别是1903年的玛丽·居里，1963年的玛丽亚·戈佩特·梅尔，2018年的唐娜·斯特里克兰。

I’m Jonathan Evans.

乔纳森·埃文斯报道。

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