For the first time in history, people witnessed two merged neutron stars creating gravitational waves

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A collision between two neutron stars, 130 light years away, has been recorded by scientists. This event is named GW170817. This is a long-anticipated gravitational event, but until now new scientists have the opportunity to observe directly.

1. Discovering new gravitational waves from two black holes collides 3 billion light-years away
2. The 2017 Nobel Prize for Physics was awarded to research on gravitational waves
3. Journey to find gravitational waves and unprecedented world discoveries

Thanks to the capture of gravitational waves from the collision, astronomers learned the time and location of the collision. This is also the first time they have observed gravitational waves and optical waves at the same time.

More than a century ago, Albert Einstein made predictions about gravitational waves but it was not until 2016 that new scientists identified it for the first time. Up to now, there are four sources of gravitational waves from the collision of identified black hole pairs.

Graphic simulating gamma ray bursts when two neutron stars merged.(Photo: ESO / L. Calçada / M. Kornmesser.)

In addition to merging a black hole, if two neutron stars collide with each other, gravitational waves are generated. And once this 5th wave is identified, it is the collision of two neutron stars.

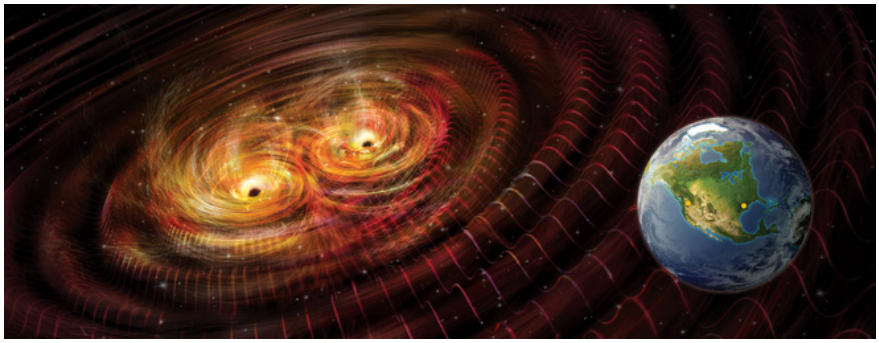
Until now, scientists have not observed collisions of black hole pairs because they suck up everything including light and the station system of Earth observation stations only scans a small area of ??the sky. In 2016, we only had two attractive LIGO wave detectors in Louisiana and Washington of the United States.

Artwork: Internet.
By 2017, the Italian Virgo detector was officially put into operation, expanding the scanning area in the sky and raising the accuracy to about 10 times. But this is still not enough to help us observe the collision of two black holes, which are essentially invisible.

But neutron stars are different, they glow so they are completely observable.

To observe the event GW170817, about 70 points of observation stations on Earth joined Virgo and LIGO to scan the sky in the constellation Hydra, right next to the galaxy NGC 4993.

LIGO was the first machine to capture the signal on August 17. Only about 1.7 seconds later, two NASA and ESA observatories recorded an intense gamma ray burst. This is the brightest and most energetic event from the sky in the universe.



Artwork: Internet.

The collision between two neutron stars, the length of the wave lasts about 100 seconds, while the waves in the collisions of the two black holes are only about a fraction of a second.

Neutron stars are what remain after a super-heavy star ends 'life'. The star collapses itself into the core, pressing protons and electrons into neutrons and neutrinos. Neutrino particles escape to the outside, but neutrons are 'stuck' and compressed into the star's core, the space is only 10 to 20 km in diameter.

This core becomes a neutron star if it has a mass less than three times the mass of the Sun and if it is bigger, it becomes a black hole.

In GW170817, two neutron stars have masses about 1.1 times and 1.6 times the mass of the Sun, moving around each other at a distance of 300 km, bending the space-time around and creating waves spread throughout the universe.

When observing from Earth, we can only observe the change in brightness during the event. It was a giant fireball that continuously bombarded gamma rays into the universe. The video below will show you the process of happening GW170817.

The brightest point in the middle is the galaxy NGC 4993, and slightly above the left (which will change color) is the place where the GW170817 event takes place.

This event helped scientists confirm the gamma-ray bursts caused by the merger of two neutron stars, which they had long suspected but now have concrete evidence.

Thanks to gravitational waves, scientists determined that the colliding object had a mass equal to that of a neutron star, but that it was not black holes because gamma rays fired too violently.

Observatories will continue to observe the collision in the coming time to learn more about the material state left after the collision.

The results of the study were published by LIGO-Virgo in Physical Review Letters.