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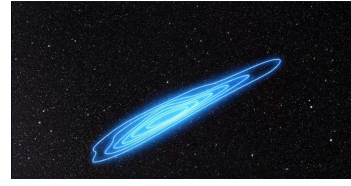
Hubblecast Episode 103: Hubble observes source of gravitational waves for the first time	Visual notes
<p>00:03 [Narrator] 1. Astronomers using the NASA/ESA Hubble Space Telescope have observed a visible counterpart to gravitational waves for the first time: a kilonova from merging neutron stars.</p>	
<p>00:16 2. Intro</p>	
<p>00:22 [Narrator] 3. On August the 17th, 2017, the LIGO–Virgo collaboration detected gravitational waves rippling through the fabric of space-time.</p>	

Just two seconds later, two space telescopes from ESA and NASA also detected a short gamma-ray burst coming from the same area of the sky.

This coincidence had never been seen before and raised hopes that astronomers had witnessed a cataclysmic event — two neutron stars combining in an explosive merger.

If so, a visible-light counterpart known as a kilonova was expected to follow.

The hunt was on!

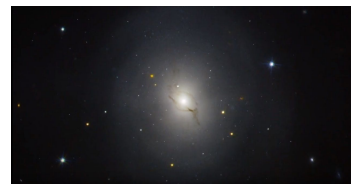
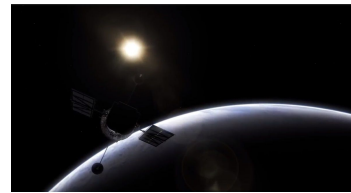


01:12

[Narrator]

4. Hubble joined a host of telescopes from the European Southern Observatory and other observatories around the world to search for a new light source. They were looking for a needle in a haystack — a faint new glimmer amid millions of stars.

But amazingly, they found it just a few hours later — in the galaxy NGC 4993, 130 million light-years from Earth.



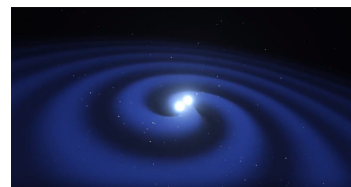
01:42

[Narrator]

5. Over the next few weeks, astronomers used a host of telescopes to record the kilonova.

Neutron star mergers are the furnaces where most of the chemical elements heavier than iron are forged. The kilonova, an event 1000 times brighter than a typical nova, spreads the newly-formed elements into the surrounding space.

These include the gold in jewelry, the platinum in catalytic converters in cars and uranium in nuclear reactors.

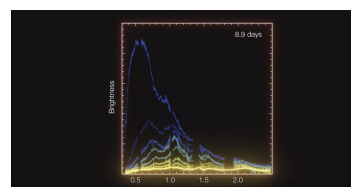


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[Narrator]

6. Such an explosion had never been confirmed before, but now one could be studied in great detail! The observations revealed an extraordinary and rapidly changing event, closely mirroring theory.

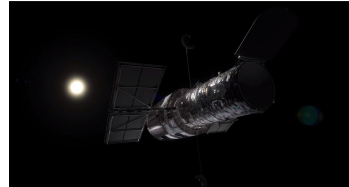
Heavy, radioactive elements were shot into space at one-fifth of the speed of light. In just a matter of days the kilonova's colour changed rapidly from blue to red, faster than any other observed stellar explosion.



02:58

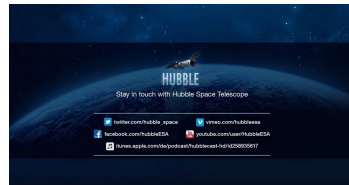
[Narrator]

7. This event marks the start of a new era of multi-messenger astronomy. For the first time in history we can now combine light signals with gravitational waves, to provide a totally new way to probe the Universe.



03:25

8. Outro



Ends 04:19