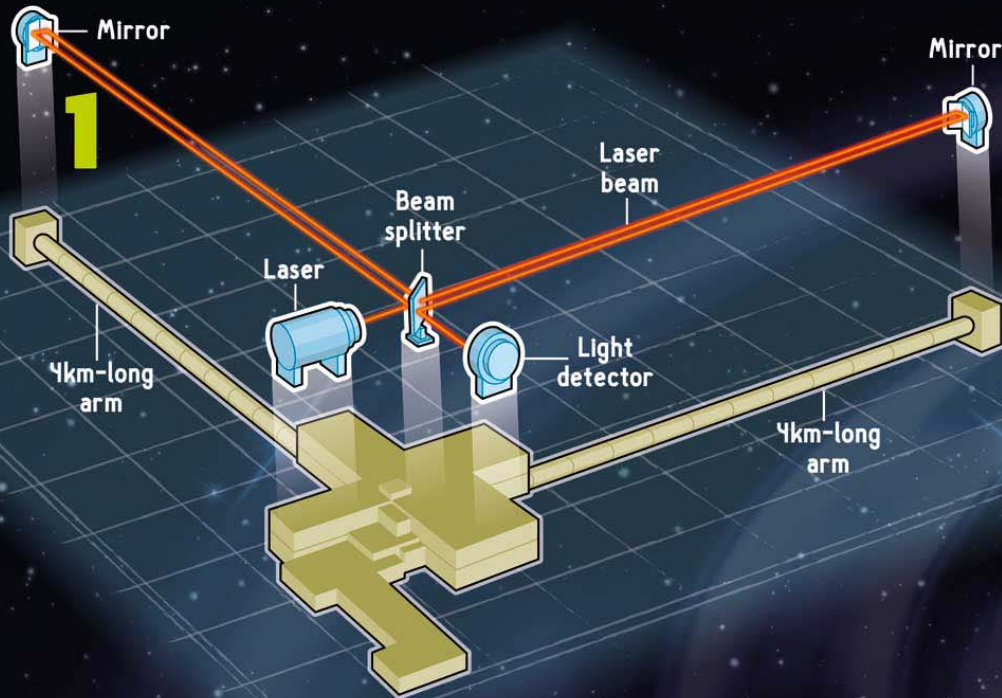


LIGO

Detecting gravitational waves on Earth

The Laser Interferometer Gravitational-wave Observatory (LIGO) consists of two identical facilities – one in Louisiana and one in Washington State. They are designed to 'listen' for gravitational energy by detecting the distortion of space created by the waves.

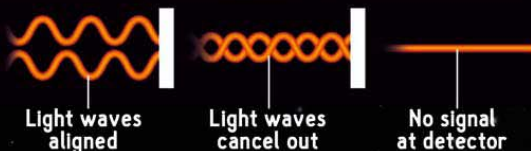
The twin LIGO facilities consist of an L-shaped detector with two arms – each four kilometres long.



1. A laser beam is split and sent down each of the arms. The beams then reflect back and forth before being recombined and sent to a light detector.

No GRAVITATIONAL WAVE

2

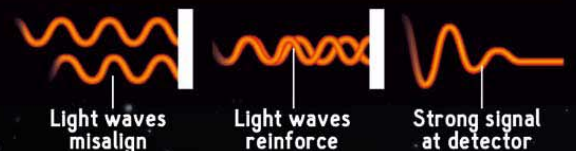
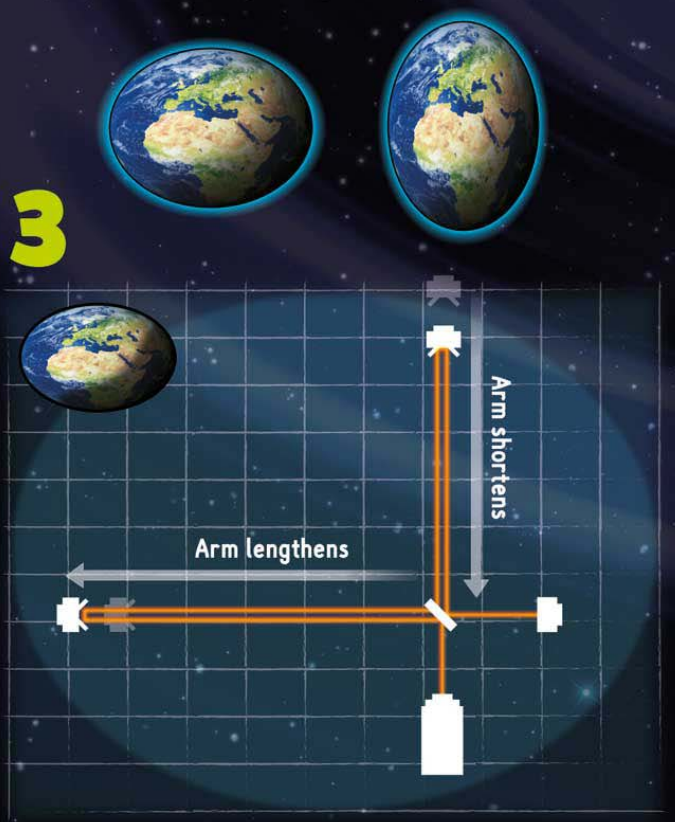


2. If the light waves line up, they cancel each other out, and no light is registered at the detector.

3. When a gravitational wave passes through, the distortion it creates changes the lengths of the arms. This causes the light waves to misalign and they no longer cancel out. This produces a measurable signal at the detector.

GRAVITATIONAL WAVE passes through

3



The amount of distortion in the arms is really tiny – about a thousandth of the diameter of a proton. Scientists have to monitor seismic and oceanic activity and human activities that might interfere with the light readings.