LIGO: Laser Interferometer Gravitational-wave Observatory at American University

PROFESSOR GREGORY HARRY, AMERICAN UNIVERSITY PHYSICS DEPARTMENT

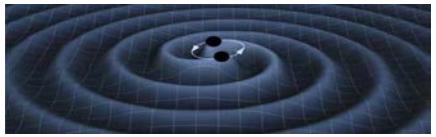
WHAT IS LIGO?

LIGO is a US National Science Foundation funded project to detect gravitational waves from space.

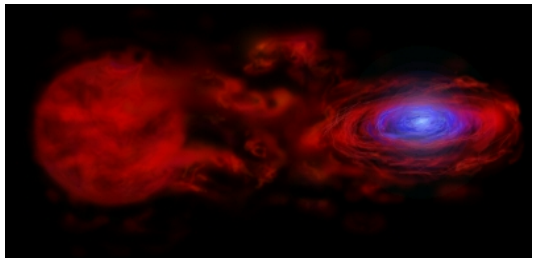
The two LIGO observatories are in Hanford, WA and Livingston, LA. There are similar detector in Europe and Japan.

ABOUT GRAVITATIONAL WAVES

In 1915, Einstein's **Theory of Relativity** predicted the existence of gravitational waves that would stretch and compress space-time. It takes astronomical objects to make detectable gravitational waves.

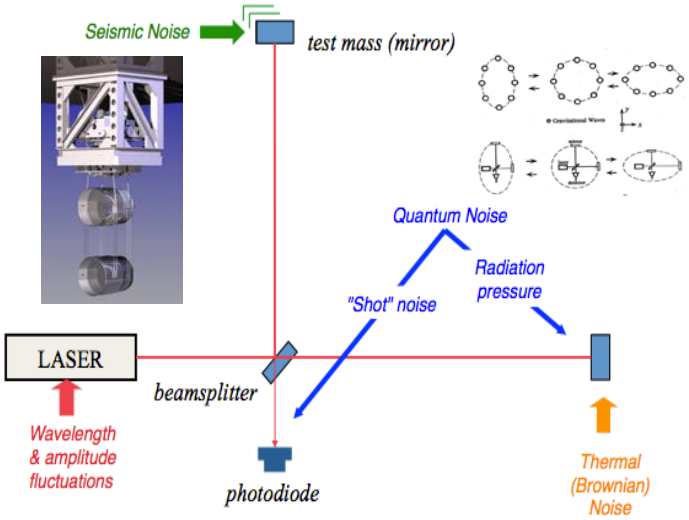


For bodies like black holes and neutron stars, the waves stretch space by 1 part in 10^{21}.

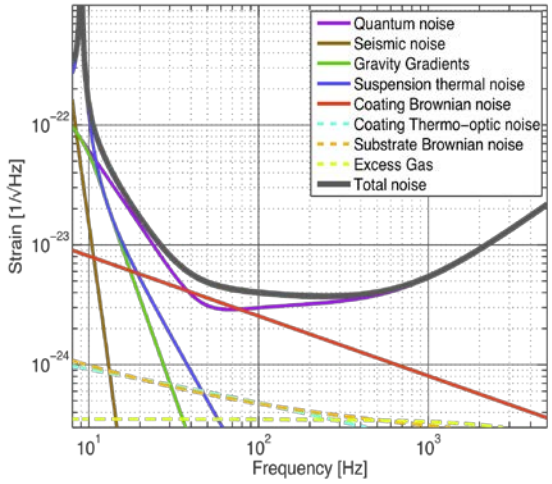


HOW DOES LIGO WORK?

The laser interferometers have two 4 kilometer long perpendicular arms with mirrors on each end. They very precisely measure the distance between the mirrors using a laser.



Because gravitational waves have a small effect on the mirrors, it is crucial to reduce other influences (noise).



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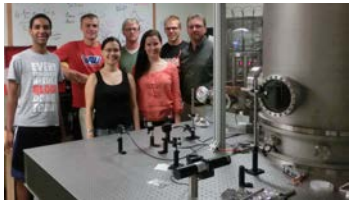
We measure properties of the mirrors to minimize thermal noise



www.ligo.org

LSC LIGO Scientific Collaboration

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