GW170817 SPECULUM

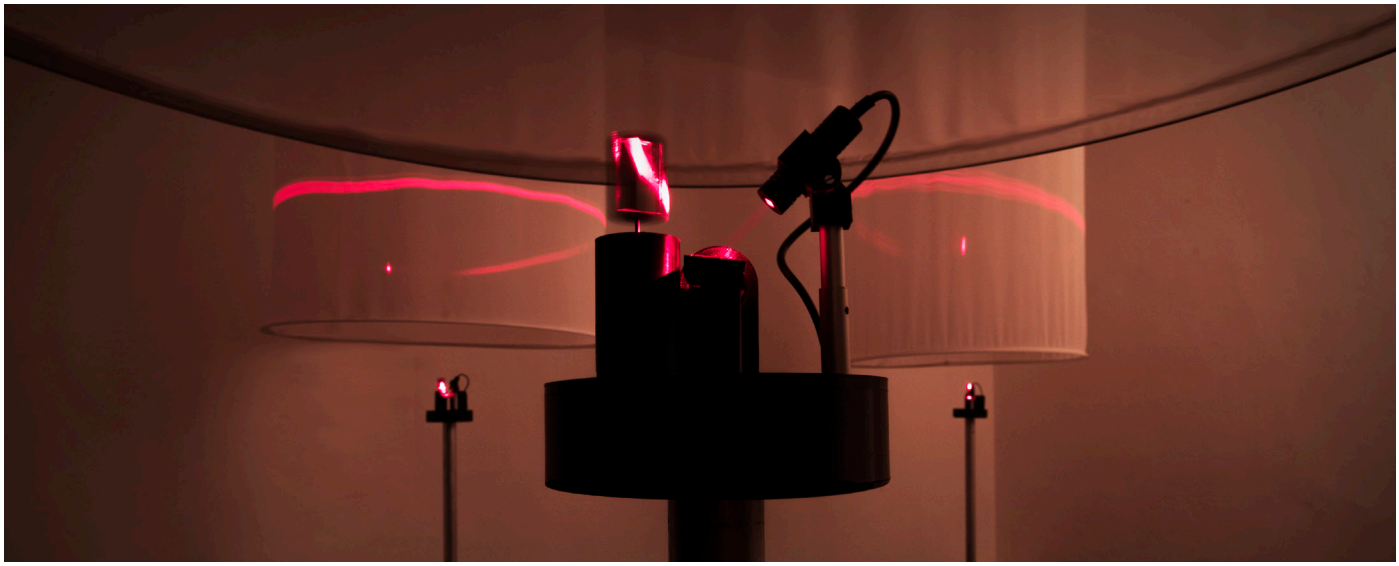
Audiovisual installation
3.1 audio system, cylindrical screens, 50 mW lasers, custom electronics

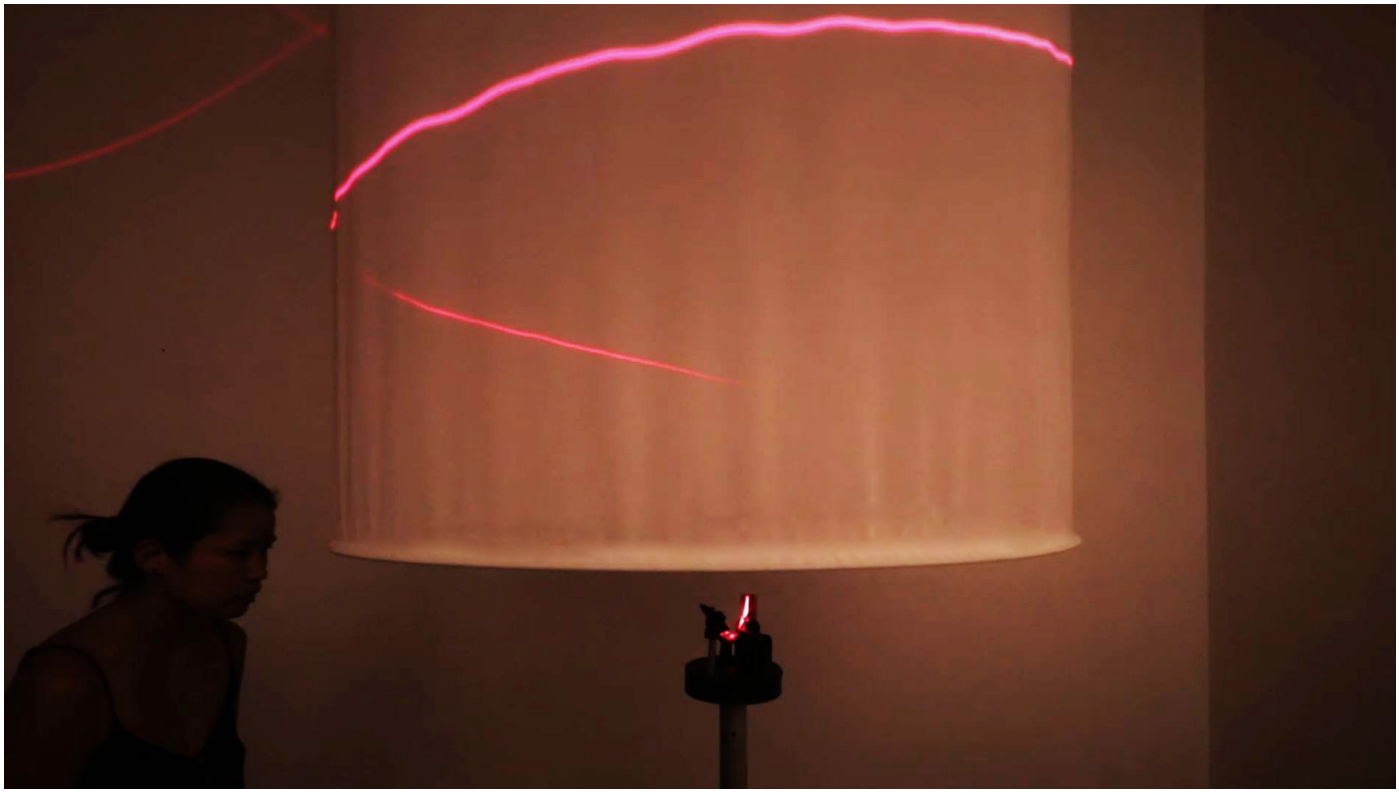
In 1915, when publishing his General Theory of Relativity, Einstein changed the world conception and opened the door to an infinity of new possibilities by arguing that gravity is the product of mass bending space and time. Therefore, when powerful masses in space are set in motion, this causes waves in space-time, which rush through the cosmos at the speed of light and deform all objects on their way, according to their distances. For forty years, astrophysicists tried unsuccessfully to prove the existence of gravitational waves, which until then had only been assumed theoretically. But even if this theory stayed purely hypothetical, it was used as the theoretical basis for astrophysical research.

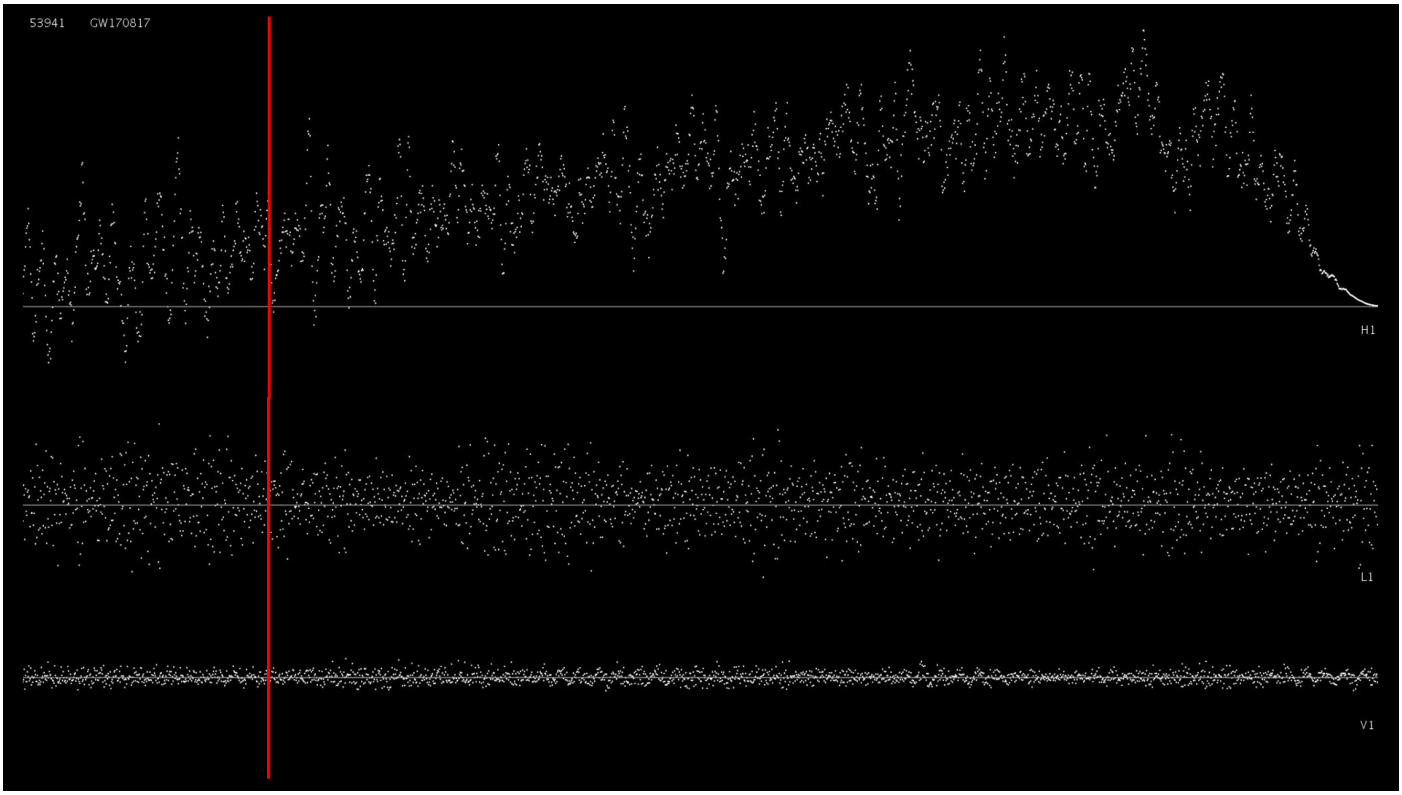
This situation is very common in physics - theories are put forward that yet have to be proved or refuted. In this process, theoretical assumption and valid proof, genuineness and speculation are constantly competing. Most of the times this concerns cosmic events, which are only perceptible to humans through the use of advanced technical instruments. Only three years ago the existence of gravitational waves was finally proven, with the help of super-detectors at the Laser Interferometer Gravitational-Wave Observatory (LIGO) in Louisiana and Washington.LIGO was able to measure the otherwise barely noticeable changes caused by these astronomical events. In 2017 the scientists Rainer Weiss, Kip Thorne and Barry Barish were rewarded with the Nobel Prize in Physics for their role in detecting gravitational waves.

Speculum, the Latin word for mirror, is the root of the verb speculate, which used to mean looking at the stars, and also speculation, the forming of a theory or conjecture without firm evidence. GW170817 SPECULUM seeks to investigate, as well as speculate, around a particular event: the recording of gravitational waves produced by the merging of two neutron stars on August 17th 2017 by the LIGO Hanford, LIGO Livingston and Virgo detectors (also known as GW170817).

In the installation, laser beams are reflected by rotating mirrors on to a cylindrical fabric, creating waves according to the event's data recorded in each one of the 3 detectors. Gravitational waves moving through time and space, which were transformed into measurable data sets, are translated back into sound and light in motion, through the same means used to detect them. The generated visuals behave differently than the original gravitational waves, yet they are able to show this cosmic phenomenon in a more perceivable way.

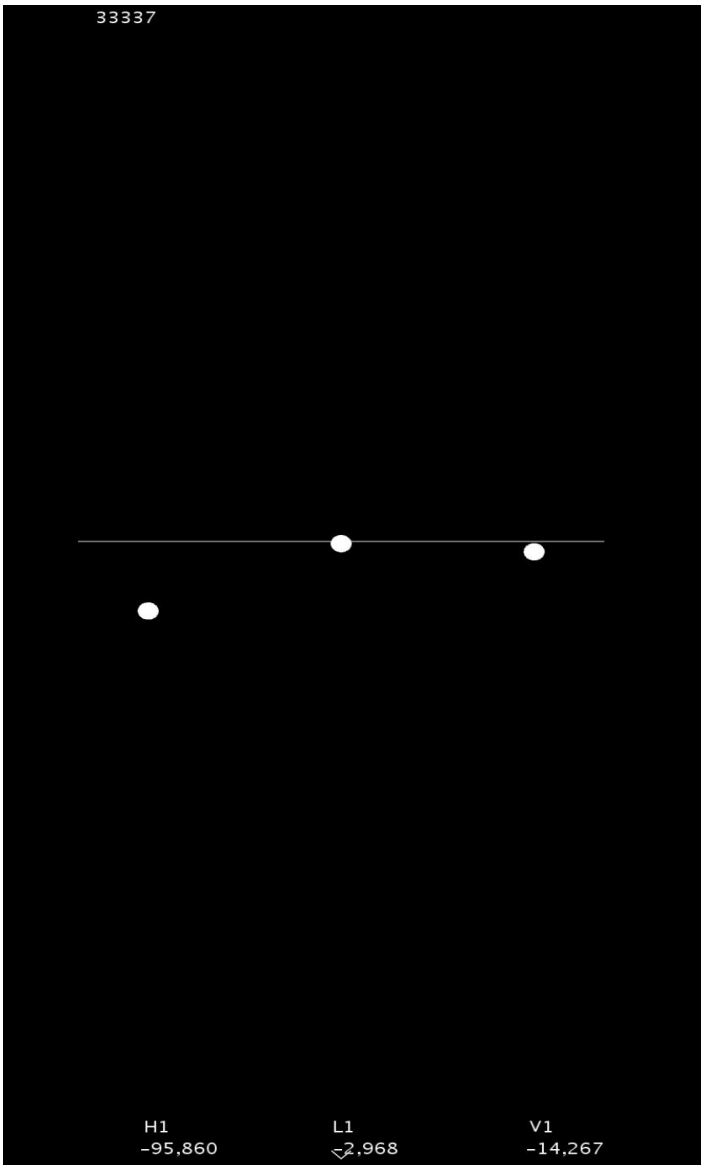




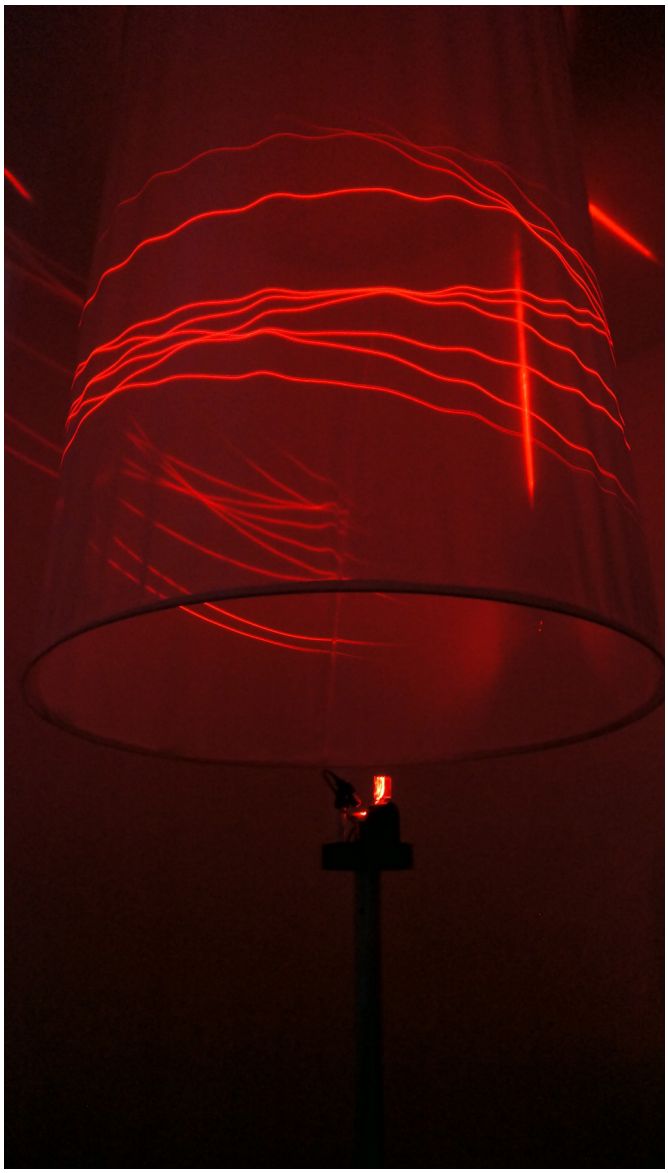


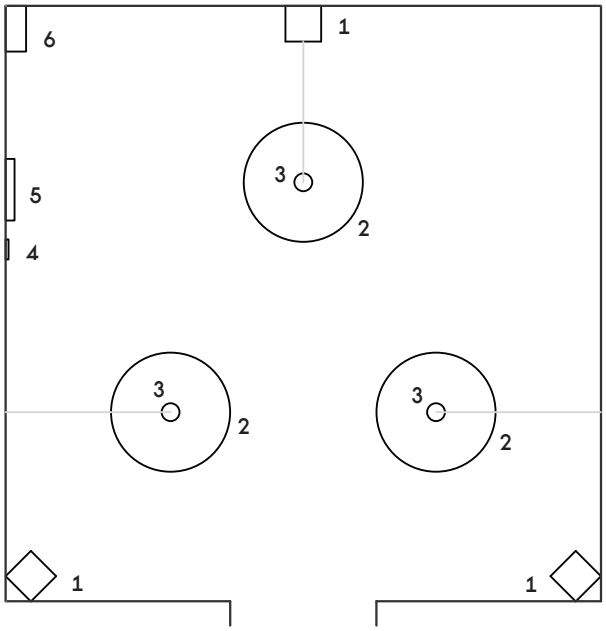
top: GW170817 data strain visualization timeline (2048 seconds)

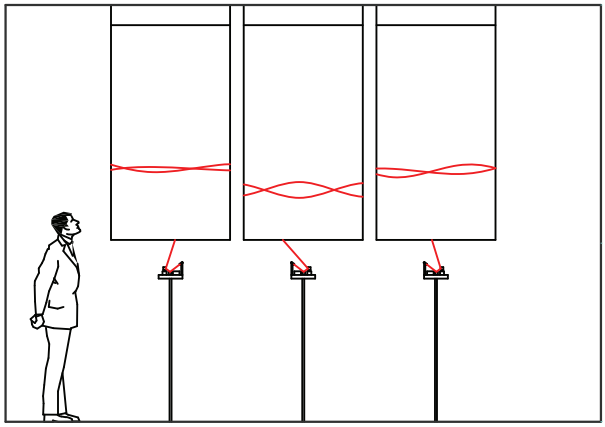
bottom left: instant data in the 3 detectors



bottom right: installation view







Description

1_ single channel speaker
2_ cylindrical fabric
3_ 3d printed laser holder
4_ LCD screen with Raspberry pi
5_ LCD monitor
6_ case with custom made electronics
7_ 5v DC motor
8_ 50 mW red laser diode
9_ cover containig the cabling