Shaking the vacuum: Gravitational waves

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Can we hear the Universe? At first sight this appears impossible as there is no air in deep space to transmit sound waves. But there is a different kind of waves that our ears would react to, if they would only be sensitive enough: Gravitational Waves!

More than 90 years ago, Einstein predicted the existence of Gravitational Waves as a consequence of his theory of General Relativity. They are minute distortions of space and time, created by rapidly accelerating large masses, and propagating at the speed of light. Several kilometer-size laser-interferometric gravitational wave detectors are currently operating on the earth, and one of them is GEO600 near Hannover. They will soon be joined by space detectors with armlengths of millions of kilometers, in particular the space mission LISA. These mysterious waves are emitted by coalescing binary stars, neutron stars, supernovae, Black Holes and the Big Bang itself, and their observation requires modern laser technology and measurements at the quantum mechanical detection limit.