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Observation of Gravitational Waves from a Binary Black Hole Merger

Prof. Benno Willke

LIGO Collaboration

Albert Einstein Institute

and Leibniz University, Hannover

For the first time, scientists have directly detected gravitational waves predicted by Einstein's theory of general relativity 100 years ago. The merger of two stellar-mass black holes was identified as the source of the gravitational waves. This discovery supports Einstein's theory in the dynamic extreme-gravity regime, demonstrates the existence of binary stellar-mass black hole systems and opens up a new observation channel to the universe. This talk will give a brief introduction to gravitational waves, their sources and on the effect they cause on Earth and discuss the technology that made this observation possible. The main results of the discovery will be presented and the applied analysis methods will be discussed as well as the future of gravitational wave astronomy.

Apl. Prof. Dr. Benno Willke received his doctoral degree in physics in 1992 from the University of Hannover, Germany in the field of plasma physics. He then worked on the design and installation of the GEO600 gravitational wave detector and the laser system of the LIGO gravitational wave detector. From 1998 to 2009 he chaired the lasers working group of the LIGO scientific collaboration (LSC) and was responsible for the



development, fabrication and installation of the Advanced LIGO laser subsystem and its stabilization. In 2014 he was appointed adjunct professor at the Leibniz Universität Hannover.

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