

# Physikalisches Kolloquium

Jan Harms, GSSI L'Aquila, Italy

»The next-generation gravitational-wave detector:  
Einstein Telescope and a future on the Moon«

*Einführung: A. Rietbrock*

---

The Virgo and LIGO gravitational-wave (GW) detectors have produced a catalogue of 50 observed mergers of compact binaries formed by black holes and neutron stars. These observations led to breakthroughs in our understanding of compact objects and their formation. Very tight constraints were set on alternative theories of gravity. However, the results will eventually be eclipsed by the vast science case of next-generation detectors like the Einstein Telescope, which will produce several 100,000 observations of compact binaries each year with a detection horizon reaching deep into the dark ages of the Universe. A good fraction of these signals will be measured with such precision that the discovery of new physics such as black-hole superradiance, or gravitational-wave echoes and other deviations from general relativity, if they exist, becomes likely. In this presentation, we will review the conceptual design and science case of the Einstein Telescope. We will then argue that some of the main limitations of terrestrial GW detection can be overcome by considering other revolutionary detector concepts such as the recently proposed Lunar GW Antenna.

---

**Freitag, 28.05.2021, 16:00 Uhr,  
live über Zoom.**