



## Gravitational wave astronomy with ground-based detectors: status and plans

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I joined the field of gravitational wave detection in 1990 when I started working on the Virgo project within Adalberto Giazotto's group at INFN Pisa. After my PhD thesis, I was hired as researcher by CNRS at LAPP Annecy (France) where I worked on the construction of the Virgo detection system. I then moved to the European Gravitational Observatory (EGO), the site of Virgo, where I took the position of vice-director and I coordinated the commissioning of Virgo. In 2007 I moved to Lyon as director of the Laboratoire des Matériaux Avancés and I worked at the realization of the large mirrors for Advanced LIGO and Advanced Virgo. In 2013 I moved to the National Astronomical Observatory of Japan in Tokyo as professor and director of the gravitational wave project office to work on the Japanese gravitational wave detector KAGRA and on the first demonstration of frequency dependent squeezing for gravitational wave detectors. Since 2018 I am director of research at CNRS LAPP. At LAPP I have been leading the Advanced Virgo+ project, contributing to the preparation of the Einstein Telescope and doing research on crystalline coatings to reduce mirror thermal noise.



### Abstract

Ten years ago, the first detection of a gravitational wave emitted from the coalescence and merger of two black holes opened the field of gravitational wave astronomy. The subsequent first observation of a gravitational wave from the coalescence of two neutron stars coinciding with the detection of a gamma ray burst kicked off the era of multi-messenger astronomy. Ten years later, about 300 events were detected, allowing statistical studies to begin. The forthcoming improvement of current detectors and the construction of new ground-based observatories will make it possible to observe almost all binary black hole coalescences and a large fraction of neutron star coalescences throughout the universe. New sources, such as supernovae and rotating neutron stars, are also likely to become observable. In this seminar I will first recall the motivation behind this research and the state of current detectors. Then I will focus on plans to improve the range of ground-based detectors and the technologies being developed to achieve this goal.

**时间： 2025年4月30日 (星期三) 9:00**

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