



Contribution ID: 90

Type: **Talk**

## Status of Advanced Virgo and upgrades before the next observing runs

*Thursday 10 September 2020 09:30 (30 minutes)*

Gravitational waves (GW) are ripples in the spacetime fabric, emitted by compact accelerating objects. On September 2015, a century after Einstein predicted the existence of GW, the first direct detection of GW from a binary black hole merger has been observed, thus opening a new window of observation on the Universe and marking the birth of GW Astronomy. This important result has been possible thanks to many years of R&D efforts done by the LIGO-Virgo collaborations for the upgrade to the second generation of ground-based GW detectors. In the following years, during the O1, O2 and O3 scientific runs, many other GW events have been detected by both LIGO and Virgo. During August 2017, when also Virgo joined the second observing run of LIGO, Advanced LIGO and Advanced Virgo detectors jointly detected GW resulting from the merger of two neutron stars. This was the first event ever detected both in the gravitational and electromagnetic windows. The network of three detectors allowed to better localise the source of the GW in the sky, and it has been possible to observe the electromagnetic counterpart with roughly 70 telescopes. The last observing run O3 started on April 1, 2019 and ended in March 2020. After the conclusion of the O3 run, a period of upgrade of the instrument is undergoing before the next run foreseen to start in January 2021. Signal-recycling mirror will be installed, and frequency dependent squeezing will be also implemented for a broadband reduction of the quantum noise. After an introduction on gravitational-wave detection, I will give an overview on the Advanced Virgo design and status. Finally, I will talk about the planned instrument upgrades towards the Advanced Virgo+ design, which will push the detector sensitivity towards the maximum achievable limit.

### Is this abstract from experiment?

Yes

### Is the speaker for that presentation defined?

Yes

### Name of experiment and experimental site

Virgo, Cascina (PISA, Italy)

### Internet talk

Yes

### Details

Speaker Dr. Sibilla DI PACE, University of Rome La Sapienza and INFN - Roma. On the behalf of the Virgo Collaboration

**Primary author:** DI PACE, Sibilla (INFN - National Institute for Nuclear Physics)

**Presenter:** DI PACE, Sibilla (INFN - National Institute for Nuclear Physics)

**Session Classification:** Plenary