The performance of the Virgo gravitational-wave detector during the O3 run (04/2019-03/2020) and the impact of the external environment

The Observation Run 3 (O3) is the longest data-taking period to-date for the LIGO-Virgo global network of ground-based interferometric gravitational-wave (GW) detectors. The GWTC catalog of transient GW events has already been updated for the first six months of the run (O3a: 2019/04/01 -> 2019/19/01) while the analysis of the last five months (O3b: 2019/11/01 -> 2020/03/27, after a one-month commissioning break) is ongoing. This talk will review the performance of the Virgo detector during the O3 run: sensitivity, duty cycle, noise stability and variations. It will in particular focus on the impact of the external environment on this performance: earthquakes, anthropogenic seismic noise, local weather at the EGO site, etc. The experience gained should allow the Virgo Collaboration to improve the robustness of its instrument against external disturbances and to develop improved strategies to mitigate their consequences. This work is ongoing during the current shutdown, besides major detector upgrades, prior to the start of the upcoming O4 run during summer 2022.