

Virgo detector characterization and data quality studies: analysis of the O3 data-taking period and ongoing developments to prepare the O4 run

Detector characterization and data quality studies (referred collectively as “DetChar” in the following) are key inputs to improve the sensitivity of a ground-based interferometric gravitational-wave (GW) detector like Virgo, to optimize the performance of the instrument during data taking periods and to vet GW candidate signals identified in low-latency or offline. DetChar is involved in the whole scientific dataflow, from the raw data recorded by the detector to the final list of GW events to be released publicly. This talk presents the activities of the Virgo DetChar group during the LIGO-Virgo Observing Run 3 (O3, April 2019 – March 2020), summarizes its main findings and concludes by describing the upgrades and improvements that are foreseen to prepare the LIGO-Virgo-KAGRA O4 run that should start during Summer 2022.