

The Observing Run 4 (O4, May 2023 – October 2025) is the longest data-taking period to date for the LIGO-Virgo-KAGRA (LVK) network of ground-based gravitational-wave (GW) detectors. Characterized by improved performance of its different detectors (the two LIGO instruments located at Hanford (WA) and Livingston (LA) in the USA; Virgo in Italy and KAGRA in Japan), this run has produced an unprecedented number of GW candidates in near-real time (significantly in excess of 200 by the time of the Amaldi Conference if the current performance holds up), publicly announced to allow astronomical multi-messenger follow-ups of these alerts.

The present talk will summarize the performance of the individual detectors and of the global LVK network during O4. It will also describe the framework that allows the LVK Collaboration to deliver vetted and accurate alerts in low latency. Finally, it will present the LVK plans for the coming years: a new series of upgrades is expected to further improve the performance of the detectors – and thus the LVK network prospects for GW detection – before the next data-taking phase.