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The KM3NeT online processing for multi-messenger alerts

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KM3NeT is a deep-sea research infrastructure under construction in the Mediterranean Sea. It consists of two water-Cherenkov neutrino telescopes: ARCA (Italy), designed to identify and study TeV-PeV astrophysical neutrino sources, and ORCA (France), aiming at studying the intrinsic properties of neutrinos in the few-GeV range. KM3NeT is sensitive also to neutrinos emitted in the MeV range by core-collapse supernovae. The complementary energy ranges of ARCA and ORCA allow them to be used for neutrino astronomy across an energy spectrum ranging from a few MeV to a few PeV, despite they have different primary goals. KM3NeT actively takes part to real-time multi-messenger searches, which aim at combining information from the simultaneous observation of complementary cosmic messengers with different observatories. These searches allow to increase the discovery potential of transient sources and refine the localization of poorly localized triggers, such as gravitational waves, by distributing alerts in real-time when pontially interesting events are detected. In this respect, the KM3NeT online analysis framework is continuously reconstructing all ARCA and ORCA events, performing core-collapse supernova analyses and searching for spatial and temporal coincidences with alerts received from other multi-messenger instruments. The selection of a sample of interesting events to send alerts to the external multi-messenger community is still in progress. This contribution deals with the description of the KM3NeT online processing.

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