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Online event reconstruction and classification in KM3NeT

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KM3NeT is the next generation deep-sea neutrino telescopes currently under construction in the Mediterranean Sea. It is composed of two water-Cherenkov neutrino detectors: ARCA and ORCA, located at two sites, south-est of Portopalo di Capo Passero (Italy) and close to Toulon (France), respectively. One of the main scientific goals of KM3NeT is to observe cosmic neutrinos and investigate their sources following a multi-messenger approach, i.e. by combining coincident detection from different telescopes.

The combination of an extended field of view and a high duty cycle is crucial for detecting and informing other telescopes about interesting neutrino candidates in a very short time. For this purpose, an efficient online framework can provide, in real time and for each event, reconstructed physical variables, like visible energy and arrival direction.
Furthermore, in order to search for neutrino signal, a high background rejection power is needed and deep learning techniques provide promising results.
The flexibility and the low amount of information required as input make Graph Neural Networks (GNNs) the perfect candidate to perform real-time event selection in parallel with the event reconstruction processes.

In this talk, the status of the KM3NeT online framework and the event reconstruction and classification algorithms will be presented.

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