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Search for time-dependent emissions of cosmic neutrinos with the KM3NeT/ARCA telescope

The identification of astrophysical sources responsible for the high-energy cosmic neutrinos is a longstanding challenge. In this context, an important breakthrough was the observation of the blazar TXS 0506+056, which was found in an enhanced gamma-ray emission state spatially and temporally coincident with an IceCube high-energy neutrino event for the first time. Subsequently, IceCube archival data revealed a bright neutrino flare in 2014 without an electromagnetic counterpart. This suggests the search for flaring neutrino emissions, not necessarily associated to gamma-ray observations. A search for events clustering in space and time is being developed using data from the KM3NeT/ARCA (Astroparticle Research with Cosmics in the Abyss) undersea Cherenkov neutrino telescope. KM3NeT/ARCA is in construction in the Mediterranean Sea. It will have a volume of a cubic kilometer occupied by more than 4000 optical modules, distributed along 230 vertical detection units. The telescope will be sensitive to high-energy neutrino studies, from 100 GeV up to multi-PeV. Presently KM3NeT/ARCA is taking data with 28 detection units. The analysis approach outlined in this contribution exploits an unbinned likelihood framework, looking for a flare of astrophysical neutrinos possibly occurred during a set of search time windows. Data have been analyzed assuming a Gaussian-shape profile for the signal temporal emission.

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