

KM3NeT/ARCA sensitivity to transient neutrino sources

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The KM3NeT collaboration is constructing a km³ volume neutrino telescope in the Mediterranean sea, called ARCA (Astroparticle Research with Cosmics in the Abyss), that will achieve an unprecedented sensitivity to high-energy cosmic neutrinos. This telescope will be able to reconstruct the arrival direction of the neutrinos with a precision of ~0.1 degrees. The configuration of ARCA makes it sensitive to neutrinos in a wide energy range, from sub-TeV up to tens of PeV. Moreover, this detector has a large field of view and a very high duty cycle, allowing for full-sky (and all-flavours) searches. All these features make ARCA an excellent instrument to study transient neutrino sources.

Atmospheric muons and neutrinos, produced by primary cosmic rays, constitute the main background for ARCA. This background can be several orders of magnitude higher than the expected cosmic neutrino flux. In this work, we introduce an event selection which reduces the background up to a negligible level inside the region of interest and within the search time window. In particular, we apply this method to estimate the ARCA sensitivity to some example targets such as interesting gravitational wave events (e.g. GW170817) and TeV gamma-ray bursts (e.g. GRB 190114C). The ARCA performance to detect a given neutrino flux, including the discovery flux, sensitivity and effective area, are provided for this particular selection.

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Collaboration

KM3NeT

other Collaboration

Subcategory

Experimental Results

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