Executive summary ICRC

Sensitivity estimates for diffuse, point-like and extendedneutrino sources with KM3NeT/ARCA

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Even though the existence of a high-energy astrophysical neutrino flux is confirmed by IceCube in 2013, the origin of most of these neutrinos remains unknown. The KM3NeT/ARCA detector that is currently under construction at the bottom of the Mediterranean Sea will have an excellent pointing resolution ($< 0.2^\circ$ for $E > 10$ TeV muon neutrinos), it will be sensitive in a large energy range (GeV - PeV), with a sky coverage with upgoing neutrinos. These conditions are perfect for the identification and characterisation of high energy astrophysical neutrino fluxes.

In order to identify a cosmic neutrino signal on top of the atmospheric background of muons and neutrinos, statistical methods are being developed based on Monte Carlo pseudo experiments. These newly developed methods presented, are the start of a bigger software framework for all future high energy astrophysical analysis.

After applying the right cuts to increase the signal to background ratio, the detector response functions are determined. These distributions are used as an input for the unbinned likelihood analysis to calculate the expected sensitivity of KM3NeT/ARCA.

The three shown analysis are to characterise the by IceCube discovered diffuse neutrino flux, to compute the sensitivity of K3NeT/ARCA to a point source at a known position in the sky and a fixed spectral index of E^{-2}, and to determine KM3NeT's capability to detect four known extended sources, where a disk or Gaussian extension is applied, and for which neutrino fluxes are derived from gamma ray fluxes with a new tool.

The results based on our new framework and BDT event selection look very promising. We have shown that our new likelihood method is in place, working, and providing convincing first results for KM3NeT/ARCA detector. In the upcoming year we will expand the options of the analysis framework and prepare an analysis for real-data.