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Constraining the contribution of Gamma-Ray Bursts to the diffuse neutrino flux with the ANTARES dataset (2007-2017)

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Addressing the origin of the observed astrophysical neutrino flux is of paramount importance nowadays, since the sources generating such neutrinos still remain a mystery. Among the likely astrophysical sources of detectable high-energy neutrinos (e.g. blazars, supernova remnants etc.), also Gamma-Ray Bursts (GRBs) play a fundamental role, since they are among the few astrophysical sources capable of achieving the required energy to contribute to the detected
astrophysical neutrino flux. Within this context, we present the results of a stacked search for muon astrophysical neutrinos performed in coincidence with 784 GRBs in the period 2007-2017 using ANTARES data. The major improvement with respect to previous analyses is now the estimation of systematic uncertainties due to poor knowledge on some of the model parameters were computed on the diffuse flux, propagating the uncertainties on the barely characterized GRB parameters of each individual burst to the stacked limit. Given the absence of coincident neutrinos with the analyzed GRBs, this analysis has allowed to constrain the contribution of the detected GRB population to the neutrino diffuse flux to be less than 10% around 100 TeV.

Collaboration name

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