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Prospects for sub-GeV astrophysical neutrino detection with IceCube

The IceCube Neutrino Observatory is currently the largest and most sensitive detector for astrophysical neutrinos and has pioneered the field of high-energy neutrino astronomy. Despite being designed with the primary goal of identifying astrophysical TeV neutrinos and their corresponding sources, recent studies, utilising the DeepCore subdetector, have shown IceCube's proficiency in being sensitive to astrophysical neutrinos at GeV energies. Currently, there is a gap in sensitivity between the supernova detection system at MeV energies and the lowest-energy triggering events around 1 GeV. In this contribution, we present the ongoing efforts to cover this gap and increase the sensitivity of IceCube to sub-GeV astrophysical neutrinos. Despite high background rates, we show how the complimentary use of manifold and supervised machine learning can make IceCube sensitive to neutrinos from transient sources down to energies of 100 MeV.

Collaboration(s)

IceCube

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