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Boosted decision trees in the classification tasks with the Telescope Array surface detector data

The Telescope Array experiment, located in Utah, USA, is aimed to the ultra-high-energy cosmic rays study with the detection of the extensive air showers (EAS). The surface detector of the Telescope Array provides multivariate data reconstructed from the waveforms of signals of the detectors which took part in a particular event. Moreover, a number of variables are composition-sensitive and may be used for the determination of the type of the primary particle. We employ the Boosted Decision Trees (BDT) technique available as the part of the ROOT::TMVA package in the mass composition study and the neutrino search with the Telescope Array surface detector. The classifier is trained with Monte-Carlo modellings: for the mass composition study proton MC set is used as background events and iron MC set is used as signal events. For the neutrino search, neutrino set is used as signal events and highly-inclined proton set is used as background events. The method was optimized to get the best separation between different primaries; the results of this approach will be presented.

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