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# Event reconstruction and gamma/hadron separation with the Tibet ASgamma experiment by multivariate machine learning algorithms

This work employs multivariate machine learning (ML) approaches to perform event reconstruction and gamma/hadron separation with the Tibet ASgamma experiment. We have simulated the entire composite array of the Tibet ASgamma experiment (Tibet III+MD), by using full Monte Carlo simulation. The simulation sample has been divided into two data sets, the high-energy data set (E > ˜10 TeV) and the low-energy data set (E < ˜10 TeV), for studying different gamma-ray sources. Results from the simulation data show that ML algorithms can improve the energy reconstruction accuracy of gamma-ray events, especially for events with a large zenith or hitting at the edge of the array. Additionally, compared to single traditional methods, the ML methods effectively reduce the cosmic ray background by 30%, while preserving the crucial gamma events. These methods are suitable for extensive air shower(EAS) experiments, which would provide some technical support and help us better understand the air shower induced by cosmic rays.

## Collaboration(s)

The Tibet-ASgamma collaboration

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