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Reconstruction of open charm mesons in relativistic heavy-ion collisions

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ROOT is a framework for large-scale data analysis that provides basic and advanced statistical methods used by the high-energy physics experiments. This framework includes machine learning algorithms from the ROOT-integrated Toolkit for Multivariate Analysis (TMVA). TMVA package is becoming widely used for data reconstruction at STAR experiment in Brookhaven National Laboratory.

Especially, significance of open charm meson reconstruction could increase importantly with TMVA Boosted Decision Trees and Rectangular Cuts methods. These mesons are reconstructed via their hadronic decay channels, where the daughter particles can be tracked and identified with excellent precision by the STAR experiment at RHIC. Topological variables, such as decay length and distance of closest approach, of these mesons are used in TMVA training and classification of signal and background candidates.

Measurements of open charm meson production could give us information on quark-gluon plasma, hot and dense nuclear matter, created in ultrarelativistic heavy-ion collisions and expected to present in the Big Bang. These collisions are accessed at Relativistic Heavy Ion Collider in BNL and Large Hadron Collider in CERN.

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