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Centrality estimation in nucleus-nucleus collisions by machine learning algorithms

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Estimation of centrality is crucial in any analysis sensitive to initial stages of nucleus-nucleus collisions. In heavy ion collisions experiments typically one can use forward detectors to measure energy of nucleon spectators as a proxy for centrality estimator. Precision of this determination in limited by the detector resolution and losses of particles on a way from an interaction point to the detector.

In this contribution we present results of application of machine learning algorithms for centrality determination in Ar+Sc collisions at SPS collision energies based on EPOS model. For this goal realistic simulations of the response of the Projectile Spectator Detector (forward hadronic calorimeter) of the NA61/SHINE experiment was used. Modular structure of detector in transverse plane allows us to use energy depositions in different modules as features for the symbolic regression, decision trees and the convolutional neural network.

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