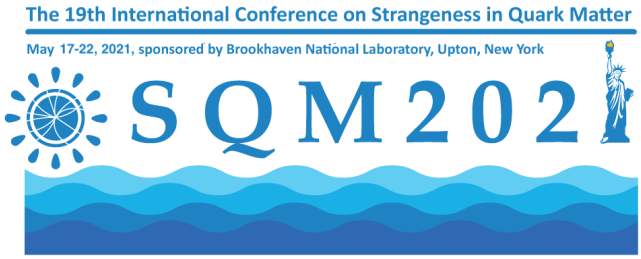

Contribution ID: **223** Type: **Experimental talk**

Machine Learning Application for Λ Hyperon Reconstruction in CBM at FAIR

Tuesday 18 May 2021 12:30 (20 minutes)

The Compressed Baryonic Matter (CBM) experiment at FAIR will investigate the QCD phase diagram in the region of high net-baryon densities (μB > 500 MeV) in the collision energy range of √sNN = 2.7–4.9 GeV with high interaction rate, up to 10 MHz, provided by the SIS100 accelerator. Enhanced production of strange baryons can signal transition to a new phase of the QCD matter. Λ hyperons are the most abundantly produced strange baryons. They weakly decay, with a branching ratio of 64%, into a proton and a negatively charged pion (π-). To reconstruct the Λ⟶π-+p decay kinematics, Particle-Finder Simple (PFSimple) package is used. PFSimple interfaces the mathematics of the Kalman Filter Particle (KFParticle) package and provides a convenient interface to control the reconstruction parameters. For the reduction of combinatorial background specific selection criteria needs to be applied to the proton and π- tracks and Λ-candidates decay topology.

In this work, the performance for Λ hyperon reconstruction in CBM with Machine Learning (ML) algorithms such as XGBoost will be presented. The ML algorithms allow efficient, non-linear and multi-dimensional selection criteria to be implemented and achieve high signal to background ratio in the region around the Λ candidate invariant mass peak.

Collaboration

CBM at FAIR

Authors: KHAN, Shahid (University of Tuebingen); Dr KLOCHKOV, Viktor (Eberhard Karls University of Tübingen, Tübingen, Germany); Mr LUBYNETS, Oleksii (GSI, Darmstadt, Germany); Dr DUBLA, Andrea (GSI, Darmstadt, Germany); Dr SELYUZHENKOV, Ilya (GSI, Darmstadt, Germany)

Presenter: KHAN, Shahid (Eberhard Karls Universität Tübingen)

Session Classification: Upgrades and New Experiments