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Characterization of flavor dependance of Chiral Magnetic Effect with multiple correlators

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We study the flavor dependance of the Chiral Magnetic Effect (CME) using two of the primary correlators used to characterize the charge separation effect. These are the correlator $\Delta\gamma$ and the correlator R_{ψ_2}. We use the AMPT (A Multiphase Transport Model) model to study the sensitivity of these correlators to two and three flavors of quarks. The AMPT model used has a centrality dependent charge separation introduced in the initial stage. We find that both the correlators indicate a strong flavor dependence in $(30-50)\%$ centrality bins. We then create a classification model with a neural network architecture and train the model using numerous combinations of the final state particle distributions. We evaluate patterns of error distribution and determine which observables are best suited for precise and accurate CME flavor estimation. We additionally implement the model to estimate the R_{ψ_2} correlator from the final state particle distribution and minimize the flow-related background effects. This method represents a novel approach to characterizing the CME flavors while reducing the background effect.

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