

Deep Learning Strange Jets (20'+5')

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By applying deep learning techniques, we explore the possibility of strange-quark tagging, which is the last missing piece among quark and gluon identifications in jets. The main difficulty here is of distinguishing strange-quark jets from down-quark jets. However, strange-quark jets are likely to contain more Kaons carrying large fractions of the jet p_T than down-quark jets. A strategy for strange-quark tagging is then to concentrate on neutral Kaons, K_L and K_S , which are expected to be discriminated from other hadrons as the K_L and long-lived K_S drop their energies only to the Hadron Calorimeter while other hadrons leave some trace in the tracker or the Electromagnetic Calorimeter. We create the pixel images of strange and down-quark jets with colors of the track p_T , hadronic energy and electromagnetic energy. The images are fed into Convolutional Neural Networks (CNNs). We find that the CNN tagger outperforms the best cut-based tagger we define.

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