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Tagging Quark and Gluon Jets with Machine Learning NATHAN YOUNG, University of Arizona, ATLAS COLLABORATION — Jets are collimated showers of particles that are produced in the hadronization of quarks and gluons. For many physics processes, it is interesting to be able to tag whether a jet arises from the hadronization of a quark or gluon. Our approach was to use a Bayesian neural network implemented using the TFLearn library in TensorFlow to tag quark and gluon jets. Seven relevant jet variables (LesHouches multiplicity, mass, PtD, rapidity, width, pt, and number of constituents) were used as input to the neural network. The main jet observable used in this study was the LesHouches multiplicity. The LesHouches is a jet variable that relates the energy of jet constituents to the angle of the jet constituents. This was compared to the other variables to find what gave the neural network the most power to discriminate between jets.

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