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Measuring distributions of quark and gluon jets by jet parameters at a hadron collider

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Quark (q) and gluon (g) jets have significantly different parameters. The normalized distribution of jets by the jet parameter can be measured. This distribution is equal to the sum of the normalized distributions of g- and q-jets (q/g-templates) with weights aG and (1-aG), respectively, where aG is the g-jet fraction in jet sample. Therefore, to measure q/g-templates, it is necessary to measure aG in advance. After that, two q/g-templates can be measured. For this, two samples of jets with significantly different aG can be used. However, q/g-templates are not universal and depend on the jet selection channel. This non-universality has a kinematic nature and can be eliminated by selecting jets from two kinematically identical channels. The disadvantage of this method is that the requirement of kinematic equivalence of jet samples reduces the jet statistics. It is possible not to reduce the statistics and introduce corrections for the non-universality of q/g-templates using modeling. In this talk, a new method for measuring q/g-templates is proposed, which uses a single jet sample and measured aG in it. The missing information is extracted from a kinematically identical model sample using a q/g-discriminator. The fact that a single channel is used in the measurement is an important practical advantage of the proposed method.

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