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Jet suppression and the flavor dependence of partonic energy loss with ATLAS

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In relativistic heavy ion collisions, a hot medium with a high density of unscreened color charges is produced. One manifestation of the energy loss of jets propagating through the medium is a lower yield of jets emerging from the medium than expected in the absence of medium effects. Therefore modifications of the jet yield are directly sensitive to the energy loss mechanism. Furthermore, jets with different flavor content are expected to be affected by the medium in different ways. Parton showers initiated by quarks tend to have fewer fragments carrying a larger fraction of the total jet energy than those resulting from gluons. Jets containing heavy quarks may lose less energy as the large quark mass suppresses the amount of medium-induced radiation. This would lead to different relative contributions of inelastic and elastic energy loss. In this talk, the latest ATLAS results on single jet suppression will be presented. Measurements of the nuclear modification factor, RAA, for fully reconstructed jets are shown. The rapidity dependence of jet suppression is discussed, which is sensitive to the relative energy loss between quark and gluon jets. New measurements of single hadron suppression out to p_T 150 GeV are also presented, which provide complementary information to the jet suppression measurements. Finally, a new measurement of the RAA for b-tagged jets is presented. At low b-jet p_T , the role of the heavy quark mass is expected to be maximal and b-jets are dominated by hard scattering processes where the b quark carries most of the momentum. As the jet p_T increases, the flavor dependence of the energy loss is expected to be reduced and a significant contribution to b quark production develops from gluon splitting in the parton shower. This measurement covers a kinematic range including both regimes and the interplay between the various effects is discussed.

On behalf of collaboration:

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