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Measurements of photon- and Z-tagged jet quenching by ATLAS

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Measurements of hard-scattered partons produced in conjunction with a high- p_T photon or Z boson offer a discerning way to study the quark gluon plasma (QGP) created in ultrarelativistic nucleus-nucleus collisions. The high- p_T boson tags the initial energy, direction, and flavor of the opposing parton or partons before they begin to shower and propagate through the QGP, offering a valuable handle for understanding the mechanism of parton energy loss.

ATLAS has performed detailed measurements of the photon-jet transverse momentum balance and the jet fragmentation function in 2015 Pb+Pb data. The significantly larger luminosity of 2018 Pb+Pb data delivered by the LHC, in addition to improvements to the electron reconstruction in heavy ion events, have enabled qualitatively new measurements in these channels with the ATLAS detector, including the first Z-tagged measurements of partonic energy loss and modification.

In this talk we will present the newest measurements of the energy loss of partons created in coincidence with a high- p_T Z boson in Pb+Pb collisions without any formal requirement on a reconstructed jet, comparing the results to predictions provided by multiple models. Prospects for further measurements requiring a reconstructed jet opposite an electroweak boson in the full Run 2 dataset will be discussed, as well as possible future observables in Run 3.

Collaboration (if applicable)

ATLAS

Track

Jets and High Momentum Hadrons

Contribution type

Contributed Talk

Primary authors: COLLABORATION, ATLAS; ZIVKOVIC, Lidija (Institute of physics Belgrade (RS))

Presenter: OUELLETTE, Jeff (University of Colorado Boulder (US))

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