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Direct Photon and Heavy Quark Jet Production at the LHC

The associated production of direct photons and heavy quarks at the LHC is presented. Predictions for both p-p and p-A collisions at ALICE, ATLAS and CMS are shown. It is demonstrated that this process is a great probe of the gluon and heavy quark nuclear PDFs, as over 80 % of the nPDF dependence at NLO comes from those nPDFs. Therefore we will show that measurements of this process will provide an excellent constraint on the gluon nPDF, which is currently mostly unconstrained. These measurements will also be very useful in distinguishing between different nPDF sets currently out on the market. Finally this process is also perfect for studying the effects of the hot nuclear medium, as the photon remains blind to it, while the heavy quarks interact with it, causing them to lose energy. Our results represent a necessary baseline for corresponding predictions for A-A collisions.

Primary author: Dr STAVREVA, Tzvetalina (LPSC)

Presenter: Dr STAVREVA, Tzvetalina (LPSC)

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