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Measurement of dilepton production from photon fusion processes in UPC and non-UPC Pb+Pb collisions with the ATLAS detector

Thursday, 30 March 2023 15:20 (20 minutes)

Relativistic heavy-ion beams at the LHC are accompanied by a large flux of equivalent photons, leading to multiple photon-induced processes. This talk presents a series of measurements of dilepton production from photon fusion performed by the ATLAS Collaboration. Recent measurements of exclusive dielectron production in ultra-peripheral collisions (UPC) are presented. These processes provide strong constraints on the nuclear photon flux and its dependence on the impact parameter and photon energy. Comparisons of the measured cross-sections to QED predictions from the Starlight and SuperChic models are also presented. Measurements of muon pairs produced via two-photon scattering processes in hadronic (i.e. Non-UPC) Pb+Pb collisions are also presented. These non-UPC measurements provide a novel test of strong-field QED and may be a potentially sensitive electromagnetic probe of the quark-gluon plasma. These measurements include the dependence of the cross-section and angular correlation on the mean- p_T of the dimuon pair, the rapidity separation between the muons, and the pair angle relative to the second-order event-plane, all measured differentially as a function of the Pb+Pb collision centrality. The presented results are compared with recent theory calculations.

Submitted on behalf of a Collaboration?

Yes

Participate in poster competition?

No

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