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Type: Oral

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

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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. Tau-pair production measurements can constrain the tau lepton's anomalous magnetic dipole moment ($g-2$), and a recent ATLAS measurement using muonic decays of tau leptons in association with electrons and tracks provides one of the most stringent limits available to date. Similarly, light-by-light scattering proceeds via loop diagrams, which can contain particles not yet directly observed. Thus, high statistics measurements of light-by-light scattering shown in this talk provide a precise and unique opportunity to investigate extensions of the Standard Model, such as the presence of axion-like particles.

Category

Experiment

Collaboration (if applicable)

ATLAS Collaboration

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