

Recent results from ultra-peripheral lead-lead collisions with ATLAS

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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 such processes performed by the ATLAS Collaboration. Measurements of exclusive dilepton production (electron, muon, and tau pairs) are discussed. These processes provide strong constraints on the nuclear photon flux and its dependence on the impact parameter and photon energy. In particular, measurements of the cross-sections in the presence of forward neutrons provide an additional experimental handle on the impact parameter range sampled in the observed events. Furthermore, the tau-pair production measurements can constrain the tau lepton's anomalous magnetic dipole moment. 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. Presented measurements of muon pairs produced via two-photon scattering processes in hadronic Pb+Pb collisions provide a novel test of strong-field QED and can be a potentially sensitive electromagnetic probe of the quark-gluon plasma. These 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 angle that the pair makes with the second-order event-plane.

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