Contribution ID: **309** Type: **Oral talk (15 min + 5 min questions)**

Searches for new physics with ultra-peripheral collisions at the LHC

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Ultra-peripheral collisions of heavy ions (UPCs) give a unique opportunity for studies of two-photon interactions in an environment with suppressed hadronic processes and enhanced electromagnetic interactions. Specifically, studies of light-by-light scattering process (LbyL) can provide a new insight on axion-like particles (ALPs) production, which emerge in a number of Standard Model extensions and are proposed as dark matter candidates. LbyL was measured by the ATLAS and CMS collaborations in the mass region above 5 GeV/c^2, and there is a possibility for the new ALICE 3 experiment to cover the low mass region, that could possibly explain muon $g-2$ discrepancy observed at the Fermilab.

Precise measurements of the anomalous magnetic moments of leptons can be used to probe effects of physics beyond the Standard Model (BSM), such as production of supersymmetric particles or composite nature of leptons. Sensitivity to BSM physics of the anomalous magnetic moment of the τ-lepton is predicted to be $\sim$280 times higher than that of the muon, but the short lifetime makes it impossible to use conventional measurement methods. UPCs are proposed as an alternative tool, as cross sections of τ production are sensitive to the anomalous magnetic moment.

In this contribution, the prospects of LbyL measurements, ALP searches and tau g-2 studies with ultra-peripheral collisions at the LHC will be discussed.

The speaker is a student or young scientist

Yes

Section

1. Intermediate and high energies, heavy ion collisions

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