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Observation of impact parameter dependence of $\mu^+\mu^-$ acoplanarity in ultra-peripheral PbPb collisions

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The CMS Collaboration reports on new differential measurements of $\gamma\gamma \rightarrow \mu^+\mu^-$ production in ultra-peripheral PbPb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02˜TeV, using data collected during the 2018 LHC run with an integrated luminosity of 1.5˜nb^{-1}. Photon-photon interactions have been observed in hadronic heavy-ion collisions by STAR and ALTAS experiments at very low transverse momentum (p_T) regions and the measured p_T and azimuthal angular correlations of lepton pairs via $\gamma\gamma$ scattering in hadronic events exhibit significant broadening compared to that from vacuum production in ultra-peripheral events. There is still no consensus on the origin of the observed broadening, which is mainly from p_T hardening of initial scattered photons as impact parameter (b) decreases toward central hadronic collisions or final-state electromagnetic modifications of lepton pairs in presence of a QGP medium. In this talk, the azimuthal angular correlations and mass spectra of $\mu^+\mu^-$ pairs via $\gamma\gamma$ scattering will be presented as a function of b and rapidity. The b dependence of $\gamma\gamma \rightarrow \mu^+\mu^-$ production provides key insights to the origin of observed broadening for photon-photon produced lepton pairs in hadronic collisions while rapidity dependence constrains the relative contributions from leading order and high order photon-photon interactions to measured $\mu^+\mu^-$ pairs.

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