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First measurement of diffraction in pPb and pp collisions with CMS and Search for elliptic azimuthal anisotropies in γp interactions within ultra-peripheral pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV

We present a first measurement of two-particle angular correlations for charged hadrons emitted from photon-proton, γp , interactions over a wide range of pseudorapidity and full azimuth. The γp events were produced within ultra-peripheral pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV and were selected by requiring a large rapidity gap in the lead-going direction and no neutron emission from the lead nucleus. The results are compared to a sample of minimum-bias pPb events with same multiplicity. The observed azimuthal correlations at large relative pseudorapidity are used to extract the first, second and third-order two-particle anisotropy harmonics, $V1D$, $V2D$, and $V3D$ as a function of track multiplicity and transverse momentum p_T . For both the photon-p and minimum-bias pPb samples $V1D$ is negative, $V2D$ is positive and $V3D$ is negative but consistent with zero. The single particle second-order harmonic, $v_2(p_T)$ is larger for photon-p events than for minimum-bias pPb collisions of the same multiplicity.

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