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New Insights from CMS pPb Data at $\sqrt{s_{NN}}$ = 8.16 TeV

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Multiparticle correlation measurements at the LHC have revealed striking evidence of collective behavior in small collision systems, such as pp and pPb, mirroring phenomena typically observed in heavy-ion (AA) collisions. However, conclusive evidence for jet quenching in pPb collisions remains elusive. This presents a puzzling scenario where the medium described by hydrodynamics, which significantly alters the distribution of final-state hadrons, seemingly leaves high-pT particles unaffected. To explore this further, two extensive analyses were conducted using a large sample of pPb collision data at $\sqrt{s_{\rm NN}} = 8.16$ TeV, recorded by CMS in 2016. The first analysis investigates jet imbalance over a wide range of multiplicities and pseudorapidities, aiming to detect potential medium-induced modifications to jets at high p_T. The second focuses on a detailed study of differential Fourier coefficients (v_n), including measurements of p_T-differential multiparticle cumulants calculated with the subevent method, probing an extended region of multiplicities, up to high particle p_T. This analysis also compares pPb results with PbPb collisions in similar multiplicity ranges, highlighting similarities and differences in behavior between these systems. This presentation will discuss the key findings from these two comprehensive studies, shedding new light on the dynamics of pPb collisions at $\sqrt{s_{\rm NN}} = 8.16$ TeV.

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