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First observation of diffraction in proton-lead collisions with the CMS detector

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We present the first measurements of diffraction in $\sqrt{s_{NN}} = 8.16$ TeV proton-lead collisions within CMS. The very large angular coverage of CMS is used to tag rapidity gaps on both the proton-going and lead-going sides and to identify both pomeron-lead and pomeron-proton topologies. Since the previous highest energy measurement of these processes was at $\sqrt{s_{NN}} = 30$ GeV, the current data provides essentially unique information. The rapidity gap distributions are sensitive to the gluon distribution within nuclei but also provide important information for modeling cosmic ray collisions. The results are compared to predictions from the EPOS, QGSJET and HIJING event generators.

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