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Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics [Open Access](#)  
Volume 800, 10 January 2020, Article number 135048

## Observation of nuclear modifications in $W^\pm$ boson production in pPb collisions at $s_{NN}=8.16\text{TeV}$ (Article) [\(Open Access\)](#)

Sirunyan, A.M.<sup>a</sup>, Tumasyan, A.<sup>a</sup>, Adam, W.<sup>b</sup>, Ambrogio, F.<sup>b</sup>, Asilar, E.<sup>b</sup>, Bergauer, T.<sup>b</sup>, Brandstetter, J.<sup>b</sup>, Dragicevic, M.<sup>b</sup>, Erö, J.<sup>b</sup>, Escalante Del Valle, A.<sup>b</sup>, Flechl, M.<sup>b</sup>, Frühwirth, R.<sup>b</sup>, Ghete, V.M.<sup>b</sup>, Hrubec, J.<sup>b</sup>, Jeitler, M.<sup>b</sup>, Krammer, N.<sup>b</sup>, Krätschmer, I.<sup>b</sup>, Liko, D.<sup>b</sup>, Madlener, T.<sup>b</sup>, Mikulec, I.<sup>b</sup>, Rad, N.<sup>b</sup>, Rohringer, H.<sup>b</sup>,

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### Abstract

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The production of  $W^\pm$  bosons is studied in proton-lead (pPb) collisions at a nucleon-nucleon centre-of-mass energy of  $s_{NN}=8.16\text{TeV}$ . Measurements are performed in the  $W^\pm \rightarrow \mu^\pm \nu_\mu$  channel using a data sample corresponding to an integrated luminosity of  $173.4 \pm 6.1 \text{nb}^{-1}$ , collected by the CMS Collaboration at the LHC. The number of positively and negatively charged  $W$  bosons is determined separately in the muon pseudorapidity region in the laboratory frame  $|\eta_{lab}| < 2.4$  and transverse momentum  $p_T^\mu > 25 \text{GeV}/c$ . The  $W^\pm$  boson differential cross sections, muon charge asymmetry, and the ratios of  $W^\pm$  boson yields for the proton-going over the Pb-going beam directions are reported as a function of the muon pseudorapidity in the nucleon-nucleon centre-of-mass frame. The measurements are compared to the predictions from theoretical calculations based on parton distribution functions (PDFs) at next-to-leading-order. The results favour PDF calculations that include nuclear modifications and provide constraints on the nuclear PDF global fits. © 2019 The Author(s)

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#### Funding text #1

We congratulate our colleagues in the CERN accelerator departments for the excellent performance of the LHC and thank the technical and administrative staffs at CERN and at other CMS institutes for their contributions to the success of the CMS effort. In addition, we gratefully acknowledge the computing centres and personnel of the Worldwide LHC Computing Grid for delivering so effectively the computing infrastructure essential to our analyses. Finally, we acknowledge the enduring support for the construction and operation of the LHC and the CMS detector provided by the following funding agencies: BMBWF and FWF (Austria); FNRS and FWO (Belgium); CNPq, CAPES, FAPERJ, FAPERGS, and FAPESP (Brazil); MES (Bulgaria); CERN; CAS, MoST, and NSFC (China); COLCIENCIAS (Colombia); MSES and CSF (Croatia); RPF (Cyprus); SENESCYT (Ecuador); MoER, ERC IUT, PUT and ERDF (Estonia); Academy of Finland, MEC, and HIP (Finland); CEA and CNRS/IN2P3 (France); BMBF, DFG, and HGF (Germany); GSRT (Greece); INFN (Italy); STFC (UK); Yandex.Fundamentals of Physics (Russia); and Yandex.Russia+ (Russia).

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#### Funding text #3

Individuals have received support from the Marie-Curie programme and the European Research Council and Horizon 2020 Grant, contract Nos. 675440 and 765710 (European Union); the Leventis Foundation; the Alfred P. Sloan Foundation; the Alexander von Humboldt Foundation; the Belgian Federal Science Policy Office; the Fonds pour la Formation à la Recherche dans l'Industrie et dans l'Agriculture (FRIA-Belgium); the Agentschap voor Innovatie door Wetenschap en Technologie (IWT-Belgium); the F.R.S.-FNRS and FWO (Belgium) under the "Excellence of Science – EOS" – be.h project n. 30820817; the Beijing Municipal Science & Technology Commission, No. Z181100004218003; the Ministry of Education, Youth and Sports (MEYS) of the Czech Republic; the Lendület ("Momentum") Programme and the János Bolyai Research Scholarship of the Hungarian Academy of Sciences, the New National Excellence Program ÚNKP, the NKFIA research grants 123842, 123959, 124845, 124850, 125105, 128713, 128786, and 129058 (Hungary); STFC (UK); Yandex.Fundamentals of Physics (Russia); and Yandex.Russia+ (Russia).

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