

Abstract Submitted  
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**Parton Distribution Function Reweighting and Associated Uncertainties in a Search for Dark Matter with the ATLAS Detector** ANNETTE LOPEZ, California State University, Fresno, ATLAS COLLABORATION — Investigating the properties of a proton involved in a proton-proton collision at the Large Hadron Collider furthers our understanding of resulting processes from the collision. In the search for dark matter produced alongside a new heavy resonance,  $Z'$ , or a  $W/Z$  boson, a process characterized by large missing transverse momentum from the undetected dark matter particles, parton distribution functions (PDFs) of protons were utilized to improve the Monte Carlo simulation of proton-proton collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector. The PDF set NNPDF30 leading order was used to generate events with applied cuts: missing transverse momentum greater than 250 GeV, pseudorapidity of  $|\eta| < 2.5$ , and groomed jets with  $R = 1.0$ . An algorithm was developed to do PDF reweighting from NNPDF30 leading order to the following PDF sets: NNPDF30 next-to-leading order, MMHT2014, HERAPDF20, CT14, and MSTW2008. Distributions of the transverse momentum, mass, azimuthal angle, rapidity, and pseudorapidity for the leading and subleading jets, as well as the missing transverse momentum, were produced with the PDF reweighting algorithm. The uncertainty associated with the choice of a particular PDF in creating these distributions was calculated.

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