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The ATLAS Collaboration

Abstract

A QCD analysis is reported of ATLAS data on inclusive $W^{\pm}$ and Z boson production in pp collisions at the LHC, jointly with ep deep inelastic scattering data from HERA. The ATLAS data exhibit sensitivity to the light quark sea composition and magnitude at Bjorken $x \sim 0.01$. Specifically, the data support the hypothesis of a symmetric composition of the light quark sea at low x. The ratio of the strange-to-down sea quark distributions is determined to be $1.00^{+0.25}_{-0.28}$ at absolute four-momentum transfer squared $Q^2 = 1.9$ GeV^2 and $x = 0.023$.

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(Dated: July 30, 2018)

A QCD analysis is reported of ATLAS data on inclusive $W^{\pm}$ and Z boson production in pp collisions at the LHC, jointly with ep deep inelastic scattering data from HERA. The ATLAS data exhibit sensitivity to the light quark sea composition and magnitude at Bjorken $x \sim 0.01$. Specifically, the data support the hypothesis of a symmetric composition of the light quark sea at low x. The ratio of the strange-to-down sea quark distributions is determined to be $1.00^{+0.25}_{-0.28}$ at absolute four-momentum transfer squared $Q^2 = 1.9$ GeV^2 and $x = 0.023$.

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Little is known about the strange quark distribution in the proton. Flavor $SU(3)$ symmetry suggests that the three light sea quark distributions are equal. However, the strange quarks may be suppressed due to their larger mass. The nucleon strange density plays an important role for a number of physics processes, ranging from measurements at proton-proton colliders of W boson production associated with charm jets [1] and of the W boson mass [2], to the formation of strange matter [3] and neutrino interactions at ultrahigh energies [4].

Knowledge of the parton distribution functions (PDFs) of the proton comes mainly from deep-inelastic lepton proton scattering experiments covering a broad range of Q^2, the absolute four-momentum transfer squared, and of Bjorken x. The PDFs are determined from data using perturbative Quantum Chromodynamics (pQCD). The region $x \lesssim 0.01$ is primarily constrained by the precise measurement of the proton structure function $F_2(x, Q^2)$ at HERA [5], which determines a specific combination of light quark and anti-quark distributions. However, the flavor composition of the total light sea, $x\Sigma = 2x(\bar{u}+\bar{d}+\bar{s})$, has not been determined at these x values.

The strange quark distribution has been accessed in charged current neutrino scattering through the subprocesses $W^+s \to c$ and $W^-\bar{s} \to \bar{c}$. This measurement has been made by the NuTeV [6] and CCFR [7] experiments, providing information on the strange and anti-strange density at $x \sim 0.1$ and $Q^2 \sim 10$ GeV^2. However, the interpretation of these data is sensitive to uncertainties from charm fragmentation and nuclear corrections. The analyses of Refs. [8–11] suggest strangeness suppression, with $\bar{s}/\bar{d} \lesssim 0.5$, whereas the analysis of Ref. [12] is consistent with $\bar{s}/\bar{d} \simeq 1$ (unsuppressed strangeness). Recent HERMES Kaon multiplicity data [13] point to a strong x dependence of the strange quark density and a rather large value of $x(s+\bar{s})$ at $x \simeq 0.04$ and $Q^2 \simeq 1.3\,\text{GeV}^2$. However, the interpretation of these data depends on the knowledge of the fragmentation of strange quarks to K mesons at low Q^2.

In the present letter it is shown that the differential measurements of the inclusive $W^{\pm}$ and Z boson cross sections at the LHC, recently performed by the ATLAS collaboration using $35\,\text{pb}^{-1}$ of pp collision data recorded in 2010 [14], provide new constraints on the strange quark distribution at high scale, $Q^2 \sim M^2_{W,Z}$, which imply constraints at low Q^2 through pQCD evolution. Because of the weak couplings of the quarks involved, complementary information to F_2 is provided which also constrains $x\Sigma$. A quantity of special interest is the ratio of the $(W^+ + W^-)$ and Z cross sections which is sensitive to the flavor composition of the quark sea [12, 15, 16] and is rather insensitive to the influence of higher order pQCD corrections [17]. The inclusive electromagnetic and weak Drell-Yan scattering process is theoretically well understood [18, 19]. The parton distribution analysis is performed here in next-to-next-to leading order (NNLO) QCD using the ATLAS data jointly with inclusive deep inelastic scattering data from HERA.

The combined $e^{\pm}p$ cross section measurements of H1 and ZEUS [5] cover a kinematic range of Q^2 from near 1 GeV^2 to above $10^4\,\text{GeV}^2$ and of x from ~ 0.6 down to 10^{-4}. The ATLAS data access a kinematic range prescribed by the boson masses, $M_{W,Z}$, and the proton beam energy, $E_p = 3.5\,\text{TeV}$, corresponding to $Q^2 \simeq M^2_{W,Z}$ and an x range $0.001 \lesssim x \lesssim 0.1$, with a mean $x = M_Z/2E_p = 0.013$ for the Z boson. The $W^{\pm}$ and Z boson differential cross sections have been measured [14] as functions of the W decay lepton (e, μ) pseudorapidity, η_l, and of the Z boson rapidity, y_Z, respectively, with an experimental precision of typically $(1-2)\,\%$ in each bin. The absolute normalization of the three cross sections is known to within $3.4\,\%$. Many systematic uncertainties on the measurements of the $W^{\pm}$ and Z boson cross sections are fully correlated. These correlations are taken into account in the analysis.

The present QCD analysis uses the HERAFitter framework [5, 20, 21]. The light quark coefficient functions are calculated to NNLO as implemented in QCDNUM [22]. The contributions of heavy quarks are calculated in the general-mass variable-flavor-number scheme of Refs. [23, 24]. The electroweak parameters and corrections relevant for the W and Z boson production processes are determined following the procedure described in Ref. [14], and the results are cross-checked between the FEWZ [19] and the DYNNLO [18] programs. The HERAFitter package uses the APPLGRID code [25] interfaced to the MCFM program [26] for fast calculation of the differential W and Z boson cross sections at NLO and a K-factor technique to correct from NLO to NNLO predictions. The data are compared to the theory using the χ^2 function defined in Refs. [27–29].

The evolution equations yield the PDFs at any value of Q^2 given that they are parametrized as functions of x at an initial scale Q_0^2. In the present analysis, this scale is chosen to be $Q_0^2 = 1.9$ GeV^2 such that it is below the charm mass threshold m_c^2. The heavy quark masses are chosen to be $m_c = 1.4$ GeV and $m_b = 4.75$ GeV. The strong coupling constant is fixed to $\alpha_S(M_Z) = 0.1176$, as in Ref. [5]. A minimum Q^2 cut of $Q^2_{min} \geq 7.5$ GeV^2 is imposed on the HERA data.

The quark distributions at the initial scale are represented by the generic form

$$xq_i(x) = A_i x^{B_i}(1-x)^{C_i} P_i(x), \tag{1}$$

where $P_i(x)$ denotes polynomials in powers of x. The parametrized quark distributions, xq_i, are chosen to be the valence quark distributions (xu_v, xd_v) and the light anti-quark distributions ($x\bar{u}$, $x\bar{d}$, $x\bar{s}$). The gluon distribution is parametrized with the more flexible form $xg(x) = A_g x^{B_g}(1-x)^{C_g} P_g(x) - A'_g x^{B'_g}(1-x)^{C'_g}$, where C'_g is set to 25 to suppress negative contributions at high x. The parameters A_{u_v} and A_{d_v} are fixed using the quark counting rule and A_g using the momentum sum rule. The normalization and slope parameters, A and B, of $\bar{u}$ and $\bar{d}$ are set equal such that $x\bar{u} = x\bar{d}$ at $x \to 0$. Terms are added in the polynomial expansion $P_i(x)$ only if required by the data, following the procedure described in Ref. [5]. This leads to one additional term, $P_{u_v}(x) = 1 + E_{u_v}x^2$.

Two types of NNLO fit, termed epWZ, are performed with different treatments of strangeness. First, the strange quark distribution is fully coupled to the down sea quark distribution and suppressed by fixing $\bar{s}/\bar{d} = 0.5$ at the initial scale Q_0^2 ("fixed $\bar{s}$ fit") as suggested by Refs. [5, 8–11]. In a second fit, $x\bar{s}$ is parametrized as in Eq. 1, with $P_{\bar{s}} = 1$ and $B_{\bar{s}} = B_{\bar{d}}$, leaving two free strangeness parameters, A_s and C_s ("free $\bar{s}$ fit"). By default it is assumed that $xs = x\bar{s}$.

Both fits result in good overall $\chi^2/N_{\rm DF}$ values of 546.1/567 with 13 free parameters, for fixed $\bar{s}$, and of 538.4/565 with 15 free parameters, for free $\bar{s}$. For the fixed $\bar{s}$ fit, the partial χ^2 of the ATLAS data is 44.5 for 30 data points. This improves significantly to 33.9 for the fit with free $\bar{s}$. This fit determines the value of $r_s = 0.5(s + \bar{s})/\bar{d}$ to be

$$r_s = 1.00 \pm 0.20_{\rm exp} \pm 0.07_{\rm mod}{}^{+0.10}_{-0.15}{}_{\rm par}{}^{+0.06}_{-0.07}{}_{\alpha_S} \pm 0.08_{\rm th}, \tag{2}$$

at Q_0^2 and $x = 0.023$, the x value, which corresponds to $x = 0.013$ at $Q^2 = M_Z^2$ as a result of QCD evolution. The combined result is $r_s = 1.00^{+0.25}_{-0.28}$.

The uncertainty of r_s (Eq. 2) is dominated by the experimental (exp) uncertainty, which is mostly driven by the statistical and systematic uncertainties of the W and Z cross section measurements. The model (mod) uncertainty includes effects due to variations ($1.25 < m_c < 1.55$ GeV and $4.5 < m_b < 5.0$ GeV) of the charm and beauty quark masses following Ref. [30], of the minimum Q^2 cut value ($5 < Q^2_{min} < 10$ GeV^2), and the value of the starting scale (Q_0^2 lowered to 1.5 GeV^2). The largest contribution to the model uncertainty of ± 0.05 comes from the variation of the charm quark mass. The parametrization (par) uncertainty corresponds to the envelope of the results obtained with the polynomials P_i, in Eq. 1, extended by one or two terms, resulting in somewhat different parton distributions with similar χ^2 as for the nominal fit. The parametrization uncertainty also includes a fit with $B_{\bar{s}}$ free. The α_s uncertainty corresponds to a variation of $\alpha_s(M_Z)$ from 0.114 to 0.121. Finally, a theoretical (th) uncertainty is assessed by comparing the DYNNLO and FEWZ predictions on the Z, W^+ and W^- fiducial cross sections, which agree at the level of 0.2, 0.5 and 1.0 %, respectively. In addition, remaining missing pure electroweak corrections may alter the QCD predictions at the per mille level. Both effects are well covered by an uncertainty of 1% on the W/Z cross section ratio and this results in a theoretical uncertainty on r_s of 0.08.

The fits impose small shifts, typically much smaller than one standard deviation, on the correlated systematic uncertainties of the data. The global normalization is observed to be shifted upwards for both fits by about the size of the luminosity measurement uncertainty. The $W^\pm$ and Z cross section measurements are compared in Fig. 1 to the NNLO fit results, after these shifts are applied to the predictions. Also shown are the ratios of the fits with free $\bar{s}$ and with fixed $\bar{s}$. It is apparent that the enhanced strange quark fraction in the free $\bar{s}$ fit has no significant effect on the prediction of the η_l distributions for both the W^+ and W^- decay leptons, while it leads to an improvement in the prediction of the y_Z distribution. An improvement is also observed in the description of the ratio of the $(W^+ + W^-)$ to the Z boson cross sections in the fiducial phase space. This is predicted to be 11.10 in the fit with fixed $\bar{s}$, while the measured value of 10.70 ± 0.15 is almost exactly reproduced in the fit with free $\bar{s}$, which gives a value of 10.74.

In order to check the robustness of the present result for r_s, a series of cross checks is performed. A fit without allowing an adjustment of the correlated errors yields a value of $r_s = 0.97 \pm 0.26_{\rm exp}$, in good agreement with Eq. 2. A fit with identical input parameters is repeated at NLO and also yields a consistent result: $r_s = 1.03 \pm 0.19_{\rm exp}$. If this NLO fit is performed with a massless heavy quark treatment then $r_s = 1.05 \pm 0.19_{\rm exp}$ is obtained. In a separate NLO study, the constraint $(x\bar{u} - x\bar{d}) \to 0$ for $x \to 0$ is relaxed. The $x\bar{d}(x)$ distribution is found to be consistent with $x\bar{u}(x)$, albeit with large uncertainties

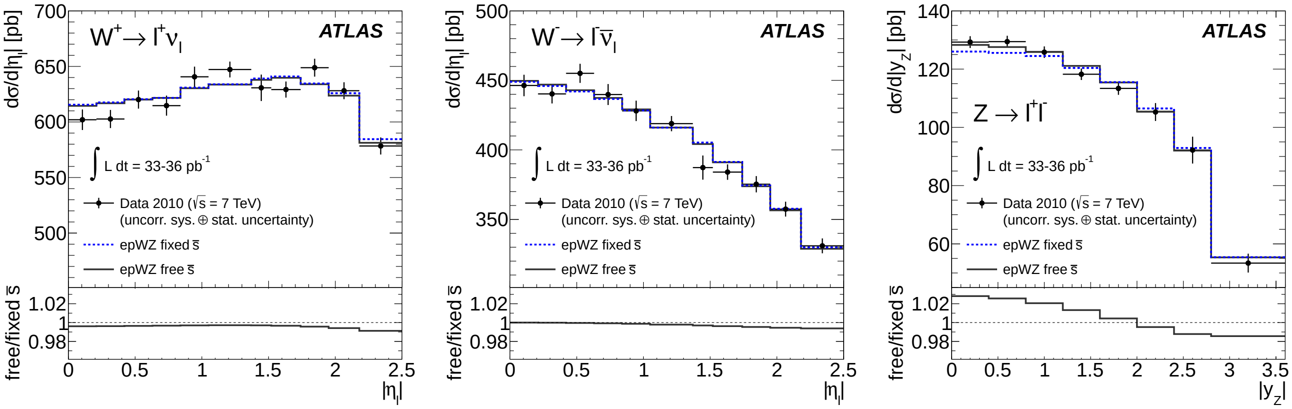

FIG. 1. Differential $\mathrm{d}\sigma/\mathrm{d}|\eta_{\ell^+}|$ (left) and $\mathrm{d}\sigma/\mathrm{d}|\eta_{\ell^-}|$ (middle) cross section measurements for $W \to \ell\nu$ and $\mathrm{d}\sigma/\mathrm{d}|y_Z|$ cross section measurement for $Z \to \ell\ell$ (right). The error bars represent the statistical and uncorrelated systematic uncertainties added in quadrature while the theoretical curves are adjusted to the correlated error shifts (see text). The NNLO fit results with free and fixed strangeness are also indicated, and their ratios are shown below the cross section plots.

($\sim 15\%$ at $x \sim 0.01$ and Q_0^2). The fraction of strangeness is again consistent with unity, $r_s = 0.96 \pm 0.25_{\rm exp}$. Finally the data are fitted, to NNLO, with separate strange and anti-strange normalizations. The resulting value of r_s is consistent with unity and the ratio $\bar{s}/s$ is $0.93 \pm 0.15_{\rm exp}$ at $x = 0.023$ and $Q^2 = Q_0^2$.

W, Z cross section measurements performed at the Tevatron may potentially have sensitivity to r_s similar to that of the ATLAS data. A NLO fit to the HERA with the CDF W asymmetry [31] and Z rapidity [32] data gives $r_s = 0.66 \pm 0.29_{\rm exp}$ at a mean x of about 0.081. This is consistent within uncertainties with both suppressed strangeness and with the present result. A NLO fit to the combined HERA, ATLAS and CDF data yields $r_s = 0.95 \pm 0.17_{\rm exp}$.

The provision of the full differential cross sections for both W^+, W^- and Z boson production, besides the *ep* cross sections, is essential for the determination of xs: if the ATLAS Z cross section data are fitted together with the ATLAS W charge asymmetry data, rather than with the separate W^+ and W^- cross section measurements, a less precise result is obtained with $r_s = 0.92 \pm 0.31_{\rm exp}$.

In Fig. 2 the present result for r_s is compared with predictions obtained from four global PDF determinations. The CT10 (NLO) [12] determination gives a large fraction consistent with the present result. On the other hand, the MSTW08 [8] and ABKM09 [9] determinations give a much lower value of $r_s \simeq 0.5$, and the NNPDF2.1 [10, 11] result of $r_s \simeq 0.25$ is even lower.

The enlarged fraction of the strange quark sea leads to a decrease of the down and up quark sea densities at the initial scale Q_0^2, because $x\bar{s}$, $x\bar{d}$ and $x\bar{u}$ are tied together at low x by the precise F_2 data. In compensation for the increase of $x\bar{s}$, the $x\bar{d}$ and $x\bar{u}$ distributions are diminished by $\simeq$ 10%. The total sea, $x\Sigma$, is correspondingly enhanced by $\simeq$ 8%, as illustrated in Fig. 3.

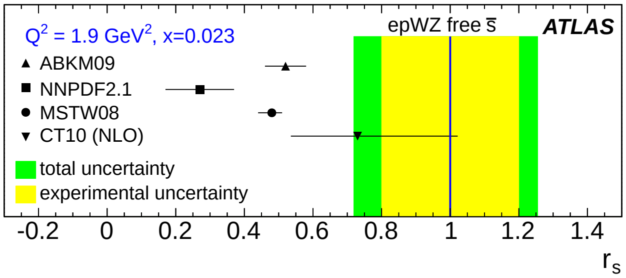

FIG. 2. Predictions for the ratio $r_s = 0.5(s + \bar{s})/\bar{d}$, at $Q^2 = 1.9\,\mathrm{GeV}^2$, $x = 0.023$. Points: global fit results using the PDF uncertainties as quoted; bands: this analysis; inner band, experimental uncertainty; outer band, total uncertainty.

The result on r_s, Eq. 2, evolves to

$$r_s = 1.00 \pm 0.07_{\rm exp} \pm 0.03_{\rm mod}{}^{+0.04}_{-0.06}{}_{\rm par} \pm 0.02_{\alpha_S} \pm 0.03_{\rm th} \quad (3)$$

at $Q^2 = M_Z^2$ and $x = 0.013$, corresponding to a value of $r_s(0.013, M_Z^2) = 1.00^{+0.09}_{-0.10}$, which is more than twice as precise as at the initial scale Q_0^2. Uncertainties are smaller at $Q^2 = M_Z^2$ because the gluon splitting probability into $q\bar{q}$ pairs is flavor independent, thus reducing any initial flavor asymmetries. This also causes r_s to increase from 0.5 at Q_0^2 to a value of about 0.8 at $Q^2 = M_Z^2$ in the fixed $\bar{s}$ fit.

In summary, a NNLO pQCD analysis is performed of the first differential ATLAS $W^\pm, Z$ *pp* cross sections with HERA $e^\pm p$ data. The W, Z measurements introduce a novel sensitivity to the strange quark density at $x \sim 0.01$, which is exploited here for the first time. The ratio of the strange to the down sea quark density is found to be $r_s = 1.00^{+0.25}_{-0.28}$, at Bjorken $x = 0.023$ and the initial scale of the QCD fit $Q_0^2 = 1.9\,\mathrm{GeV}^2$. This is consistent with the prediction that the light quark sea at low x is flavor

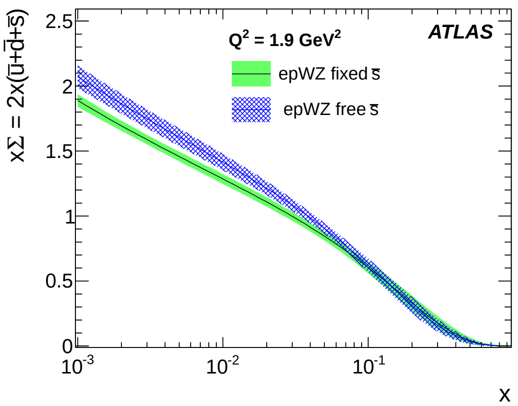

FIG. 3. Distribution of the light sea quarks, $x\Sigma = 2x(\bar{u} + \bar{d} + \bar{s})$, in the NNLO analysis of HERA and ATLAS data with a fixed fraction of strangeness (lower, green curve) and with a fitted fraction of about unity (upper blue curve). The bands represent the experimental uncertainties.

symmetric. A consequence of this initial observation is that the total sea, $x\Sigma = 2x(\bar{u} + \bar{d} + \bar{s})$, is enhanced by about 8 %, as compared to the result when the strange quark is suppressed to half the magnitude of the down sea quark.

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[1] U. Baur, F. Halzen, S. Keller, M. L. Mangano, and K. Riesselmann, Phys. Lett. **B318**, 544 (1993)
[2] M. Krasny, F. Dydak, F. Fayette, W. Placzek, and A. Siodmok, Eur. Phys. J. **C69**, 379 (2010)
[3] E. Farhi and R. Jaffe, Phys. Rev. **D30**, 2379 (1984)
[4] R. Gandhi, C. Quigg, M. H. Reno, and I. Sarcevic, Phys. Rev. **D58**, 093009 (1998)
[5] F. D. Aaron *et al.* (H1 and ZEUS Collaborations), JHEP **01**, 109 (2010)
[6] D. Mason *et al.* (NuTeV Collaboration), Phys. Rev. Lett. **99**, 192001 (Nov 2007)
[7] M. Goncharov *et al.* (CCFR and NuTeV Collaborations), Phys. Rev. **D64**, 112006 (2001)
[8] A. Martin, W. Stirling, R. Thorne, and G. Watt, Eur. Phys. J. **C63**, 189 (2009)
[9] S. Alekhin, J. Blumlein, S. Klein, and S. Moch, Phys. Rev. **D81**, 014032 (2010)
[10] R. D. Ball *et al.*, Nucl. Phys. **B809**, 1 (2009)
[11] R. D. Ball *et al.*, Nucl. Phys. **B855**, 153 (2012)
[12] H.-L. Lai *et al.*, Phys. Rev. **D82**, 074024 (2010)
[13] A. Airapetian *et al.* (HERMES Collaboration), Phys. Lett. **B666**, 446 (2008)
[14] ATLAS Collaboration pRD to appear, arXiv:1109.5141 [hep-ex]
[15] K. Kovarik *et al.*, proceedings of the Ringberg Workshop: New Trends in HERA Physics (2011), arXiv:1201.1946 [hep-ph]
[16] P. Nadolsky, SMU-HEP-09-21, 2006, arXiv:0809.0945 [hep-ph]
[17] W. van Neerven and E. Zijlstra, Nucl. Phys. **B382**, 11 (1992)
[18] S. Catani, L. Cieri, G. Ferrera, D. de Florian, and M. Grazzini, Phys. Rev. Lett. **103**, 082001 (2009)
[19] C. Anastasiou, L. J. Dixon, K. Melnikov, and F. Petriello, Phys. Rev. **D69**, 094008 (2004)
[20] HERAFitter, http://projects.hepforge.org/herafitter.
[21] F. Aaron *et al.* (H1 Collaboration), Eur. Phys. J. **C64**, 561 (2009)
[22] M. Botje, Comput. Phys. Commun. **182**, 490 (2011)
[23] R. S. Thorne and R. G. Roberts, Phys. Rev. D **57**, 6871 (1998)
[24] R. S. Thorne, Phys. Rev. **D73**, 054019 (2006)
[25] T. Carli *et al.*, Eur. Phys. J. **C66**, 503 (2010)
[26] J. M. Campbell and R. K. Ellis, Nucl. Phys. Proc. Suppl. **205-206**, 10 (2010)
[27] F. Aaron *et al.* (H1 Collaboration), Eur. Phys. J. **C63**, 625 (2009)
[28] C. Adloff *et al.* (H1 Collaboration), Eur. Phys. J. **C30**, 1 (2003)
[29] S. Chekanov *et al.* (ZEUS Collaboration), Phys. Rev. **D67**, 012007 (2003)
[30] A. Martin, W. Stirling, R. Thorne, and G. Watt, Eur.Phys.J. **C70**, 51 (2010), arXiv:1007.2624 [hep-ph]
[31] T. A. Aaltonen *et al.* (CDF Collaboration), Phys. Rev. Lett. **102**, 181801 (2009)
[32] T. A. Aaltonen *et al.* (CDF Collaboration), Phys. Lett. **B692**, 232 (2010)

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M. Abolins[87], O.S. AbouZeid[157], H. Abramowicz[152], H. Abreu[114], E. Acerbi[88a,88b], B.S. Acharya[163a,163b],
L. Adamczyk[37], D.L. Adams[24], T.N. Addy[56], J. Adelman[174], M. Aderholz[98], S. Adomeit[97], P. Adragna[74],
T. Adye[128], S. Aefsky[22], J.A. Aguilar-Saavedra[123b,a], M. Aharrouche[80], S.P. Ahlen[21], F. Ahles[48], A. Ahmad[147],
M. Ahsan[40], G. Aielli[132a,132b], T. Akdogan[18a], T.P.A. Åkesson[78], G. Akimoto[154], A.V. Akimov [93], A. Akiyama[66],
M.S. Alam[1], M.A. Alam[75], J. Albert[168], S. Albrand[55], M. Aleksa[29], I.N. Aleksandrov[64], F. Alessandria[88a],
C. Alexa[25a], G. Alexander[152], G. Alexandre[49], T. Alexopoulos[9], M. Alhroob[20], M. Aliev[15], G. Alimonti[88a],
J. Alison[119], M. Aliyev[10], B.M.M. Allbrooke[17], P.P. Allport[72], S.E. Allwood-Spiers[53], J. Almond[81],
A. Aloisio[101a,101b], R. Alon[170], A. Alonso[78], B. Alvarez Gonzalez[87], M.G. Alviggi[101a,101b], K. Amako[65],
P. Amaral[29], C. Amelung[22], V.V. Ammosov[127], A. Amorim[123a,b], G. Amorós[166], N. Amram[152], C. Anastopoulos[29],
L.S. Ancu[16], N. Andari[114], T. Andeen[34], C.F. Anders[20], G. Anders[58a], K.J. Anderson[30], A. Andreazza[88a,88b],
V. Andrei[58a], M-L. Andrieux[55], X.S. Anduaga[69], A. Angerami[34], F. Anghinolfi[29], A. Anisenkov[106], N. Anjos[123a],
A. Annovi[47], A. Antonaki[8], M. Antonelli[47], A. Antonov[95], J. Antos[143b], F. Anulli[131a], S. Aoun[82], L. Aperio Bella[4],
R. Apolle[117,c], G. Arabidze[87], I. Aracena[142], Y. Arai[65], A.T.H. Arce[44], S. Arfaoui[147], J-F. Arguin[14], E. Arik[18a,*],
M. Arik[18a], A.J. Armbruster[86], O. Arnaez[80], C. Arnault[114], A. Artamonov[94], G. Artoni[131a,131b], D. Arutinov[20],
S. Asai[154], R. Asfandiyarov[171], S. Ask[27], B. Åsman[145a,145b], L. Asquith[5], K. Assamagan[24], A. Astbury[168],
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