

Erratum of: Hadron Transverse Momentum Distributions in Muon Deep Inelastic Scattering at 160 GeV/c

C. Adolph⁸, M.G. Alekseev²⁴, V.Yu. Alexakhin⁷, Yu. Alexandrov^{15,†}, G.D. Alexeev⁷, A. Amoroso²⁷, V. Andrieux²², A. Austregesilo^{10,17}, B. Badelek³¹, F. Balestra²⁷, J. Barth⁴, G. Baum¹, Y. Bedfer²², A. Berlin², J. Bernhard¹³, R. Bertini²⁷, K. Bicker^{10,17}, J. Bieling⁴, R. Birska²⁴, J. Bisplinghoff³, M. Boer²², P. Bordalo^{12,a}, F. Bradamante²⁵, C. Braun⁸, A. Bravar²⁴, A. Bressan²⁵, M. Büchele⁹, E. Burtin²², L. Capozza²², M. Chiosso²⁷, S.U. Chung¹⁷, A. Cicuttin²⁶, M.L. Crespo²⁶, S. Dalla Torre²⁴, S.S. Dasgupta²⁴, S. Dasgupta⁶, O.Yu. Denisov²⁸, S.V. Donskov²¹, N. Doshita³³, V. Duic²⁵, W. Dünneweber¹⁶, M. Dziewiecki³², A. Efremov⁷, C. Elia²⁵, P.D. Eversheim³, W. Eyrich⁸, M. Faessler¹⁶, A. Ferrero²², A. Filin²¹, M. Finger¹⁹, M. Finger jr.¹⁹, H. Fischer⁹, C. Franco¹², N. du Fresne von Hohenesche^{13,10}, J.M. Friedrich¹⁷, V. Frolov¹⁰, R. Garfagnini²⁷, F. Gautheron², O.P. Gavrichtchouk⁷, S. Gerassimov^{15,17}, R. Geyer¹⁶, M. Giorgi²⁵, I. Gnesi²⁷, B. Gobbo²⁴, S. Goertz⁴, S. Grabmüller¹⁷, A. Grasso²⁷, B. Grube¹⁷, R. Gushterski⁷, A. Guskov⁷, T. Guthörl^{9,b}, F. Haas¹⁷, D. von Harrach¹³, F.H. Heinsius⁹, F. Herrmann⁹, C. Heß², F. Hinterberger³, Ch. Höppner¹⁷, N. Horikawa^{18,c}, N. d'Hose²², S. Huber¹⁷, S. Ishimoto⁹, Yu. Ivanshin⁷, T. Iwata³³, R. Jahn³, V. Jary²⁰, P. Jasinski¹³, R. Joosten³, E. Kabuß¹³, D. Kang¹³, B. Ketzer¹⁷, G.V. Khaustov²¹, Yu.A. Khokhlov^{21,e}, Yu. Kisselev², F. Klein⁴, K. Klimaszewski³⁰, J.H. Koivuniemi², V.N. Kolosov²¹, K. Kondo³³, K. Königsmann⁹, I. Konorov^{15,17}, V.F. Konstantinov²¹, A.M. Kotzinian²⁷, O. Kouznetsov^{7,22}, M. Krämer¹⁷, Z.V. Kroumchtein⁷, N. Kuchinski⁷, F. Kunne²², K. Kurek³⁰, R.P. Kurjata³², A.A. Lednev²¹, A. Lehmann⁸, S. Levorato²⁵, J. Lichtenstadt²³, A. Maggiora²⁸, A. Magnon²², N. Makke^{22,25}, G.K. Mallot¹⁰, A. Mann¹⁷, C. Marchand²², A. Martin²⁵, J. Marzec³², H. Matsuda³³, T. Matsuda¹⁴, G. Meshcheryakov⁷, W. Meyer², T. Michigami³³, Yu.V. Mikhailov²¹, Y. Miyachi³³, A. Morreale^{22,f}, A. Nagaytsev⁷, T. Nagel¹⁷, F. Nerling⁹, S. Neubert¹⁷, D. Neyret²², V.I. Nikolaenko²¹, J. Novy²⁰, W.-D. Nowak⁹, A.S. Nunes¹², A.G. Olshevsky⁷, M. Ostrick¹³, R. Panknin⁴, D. Panzieri²⁹, B. Parsamyan²⁷, S. Paul¹⁷, G. Piragino²⁷, S. Platchkov²², J. Pochodzalla¹³, J. Polak^{11,25}, V.A. Polyakov²¹, J. Pretz^{4,g}, M. Quaresima¹², C. Quintans¹², J.-F. Rajotte¹⁶, S. Ramos^{12,a}, G. Reicherz², E. Rocco¹⁰, V. Rodionov⁷, E. Rondio³⁰, N.S. Rossiyskaya⁷, D.I. Ryabchikov²¹, V.D. Samoilenko²¹, A. Sandacz³⁰, M.G. Sapozhnikov⁷, S. Sarkar⁶, I.A. Savin⁷, G. Sbrizzai²⁵, P. Schiavon²⁵, C. Schill⁹, T. Schlüter¹⁶, A. Schmidt⁸, K. Schmidt^{9,b}, L. Schmitt^{17,h}, H. Schmieden³, K. Schönning¹⁰, S. Schopferer⁹, M. Schott¹⁰, O.Yu. Shevchenko^{7,†}, L. Silva¹², L. Sinha⁶, S. Sirtl⁹, M. Slunecka¹⁹, S. Sosio²⁷, F. Sozzi²⁴, A. Srnka⁵, L. Steiger²⁴, M. Stolarski¹², M. Sulc¹¹, R. Sulej³⁰, H. Suzuki^{33,c}, P. Sznajder³⁰, S. Takekawa²⁸, J. Ter Wolbeek^{9,b}, S. Tessaro²⁴, F. Tessarotto²⁴, F. Thibaud²², S. Uhl¹⁷, I. Uman¹⁶, M. Vandenbroucke²², M. Virius²⁰, L. Wang², T. Weisrock¹³, M. Wilfert¹³, R. Windmolders⁴, W. Wislicki³⁰, H. Wollny²², K. Zaremba³², M. Zavertyaev¹⁵, E. Zemlyanichkina⁷, N. Zhuravlev⁷, M. Ziembicki³²

¹ Universität Bielefeld, Fakultät für Physik, 33501 Bielefeld, Germanyⁱ

² Universität Bochum, Institut für Experimentalphysik, 44780 Bochum, Germanyⁱ

³ Universität Bonn, Helmholtz-Institut für Strahlen- und Kernphysik, 53115 Bonn, Germanyⁱ

⁴ Universität Bonn, Physikalisches Institut, 53115 Bonn, Germanyⁱ

⁵ Institute of Scientific Instruments, AS CR, 61264 Brno, Czech Republic^j

⁶ Matrivani Institute of Experimental Research & Education, Calcutta-700 030, India^k

⁷ Joint Institute for Nuclear Research, 141980 Dubna, Moscow region, Russia^l

⁸ Universität Erlangen-Nürnberg, Physikalisches Institut, 91054 Erlangen, Germanyⁱ

⁹ Universität Freiburg, Physikalisches Institut, 79104 Freiburg, Germany^{i,p}

¹⁰ CERN, 1211 Geneva 23, Switzerland

¹¹ Technical University in Liberec, 46117 Liberec, Czech Republic^j

¹² LIP, 1000-149 Lisbon, Portugal^m

¹³ Universität Mainz, Institut für Kernphysik, 55099 Mainz, Germanyⁱ

¹⁴ University of Miyazaki, Miyazaki 889-2192, Japanⁿ

¹⁵ Lebedev Physical Institute, 119991 Moscow, Russia

¹⁶ Ludwig-Maximilians-Universität München, Department für Physik, 80799 Munich, Germany^{i,o}

¹⁷ Technische Universität München, Physik Department, 85748 Garching, Germany^{i,o}

¹⁸ Nagoya University, 464 Nagoya, Japanⁿ

¹⁹ Charles University in Prague, Faculty of Mathematics and Physics, 18000 Prague, Czech Republic^j

²⁰ Czech Technical University in Prague, 16636 Prague, Czech Republic^j

²¹ State Research Center of the Russian Federation, Institute for High Energy Physics, 142281 Protvino, Russia

²² CEA IRFU/SPhN Saclay, 91191 Gif-sur-Yvette, France^p

²³ Tel Aviv University, School of Physics and Astronomy, 69978 Tel Aviv, Israel^q

²⁴ Trieste Section of INFN, 34127 Trieste, Italy

²⁵ University of Trieste, Department of Physics and Trieste Section of INFN, 34127 Trieste, Italy

²⁶ Abdus Salam ICTP and Trieste Section of INFN, 34127 Trieste, Italy

²⁷ University of Turin, Department of Physics and Torino Section of INFN, 10125 Turin, Italy

²⁸ Torino Section of INFN, 10125 Turin, Italy

²⁹ University of Eastern Piedmont, 15100 Alessandria, and Torino Section of INFN, 10125 Turin, Italy

³⁰ National Centre for Nuclear Research, 00-681 Warsaw, Poland^f

³¹ University of Warsaw, Faculty of Physics, 02-093 Warsaw, Poland^f

³² Warsaw University of Technology, Institute of Radioelectronics, 00-665 Warsaw, Poland^f

³³ Yamagata University, Yamagata, 992-8510 Japanⁿ

This paper is an erratum to a previous paper [1] (EPJC 73 (2013) 2531) published by the COMPASS collaboration using a data sample taken in 2004.

In the course of the ongoing analysis of the more recent 2006 data sample, and following some additional hints [2, 3] we identified a problem in the analysis of the 2004 data presented in EPJC 73 (2013) 2531. The acceptance correction for the 2004 data sample did not properly account for the use of semi-inclusive triggers on top of the inclusive triggers.

While not affecting significantly the shape of the distributions as a function of p_T^2 , the problem in the acceptance corrections causes a significant (up to 25%) z and y dependent bias in the p_T^2 -integrated multiplicities obtained from Ref. [1].

The main emphasis of the article was the study of the z -dependence of the exponential-slope parameter $\langle p_T^2 \rangle$ as a potential tool to extract the average intrinsic transverse momentum squared of partons $\langle k_{\perp}^2 \rangle$. The absolute normalization does not enter the analysis.

In addition, we would like to point out that the radiative corrections were not applied to the multiplicity results, which may not be fully evident from the text.

We have also checked using the RADGEN [4] simulation that the radiative corrections do not significantly affect the shape of the distributions as a function of p_T^2 , either in the range of the fits $0.01 (\text{GeV}/c)^2 < p_T^2 < 0.72 (\text{GeV}/c)^2$,

or in the range $p_T^2 < 1.3 (\text{GeV}/c)^2$ of the multiplicity results. The radiative corrections to the multiplies integrated over p_T^2 depend on both Bjorken x and inelasticity y . The corrections are below 15% over the full range of the measurement.

The results and conclusions drawn in Ref. [1] are not affected by the error, and a full reanalysis of the data is not foreseen. The only change to the published article is in the last sentence of the second paragraph of the section labeled Results. The last sentence should read as follows: “The point-to-point systematic uncertainty in the measured multiplicities as a function of p_T^2 is estimated to be 5% of the measured value. The systematic uncertainty in the overall normalization of the p_T^2 -integrated multiplicities depends on z and y and can be as large as 40%”.

[†]Deceased

^aAlso at IST, Universidade Técnica de Lisboa, Lisbon, Portugal

^bSupported by the DFG Research Training Group Programme 1102 “Physics at Hadron Accelerators”

^cAlso at Chubu University, Kasugai, Aichi, 487-8501 Japanⁿ

^dAlso at KEK, 1-1 Oho, Tsukuba, Ibaraki, 305-0801 Japan

^eAlso at Moscow Institute of Physics and Technology, Moscow Region, 141700, Russia

^fpresent address: National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230, United States

^gpresent address: RWTH Aachen University, III. Physikalisches Institut, 52056 Aachen, Germany

^hAlso at GSI mbH, Planckstr. 1, D-64291 Darmstadt, Germany

ⁱSupported by the German Bundesministerium für Bildung und Forschung

^jSupported by Czech Republic MEYS Grants ME492 and LA242

^kSupported by SAIL (CSR), Govt. of India

^lSupported by CERN-RFBR Grants 08-02-91009

^mSupported by the Portuguese FCT - Fundação para a Ciência e Tecnologia, COMPETE and QREN, Grants CERN/FP/109323/2009, CERN/FP/116376/2010 and CERN/FP/123600/2011

ⁿSupported by the MEXT and the JSPS under the Grants No.18002006, No.20540299 and No.18540281; Daiko Foundation and Yamada Foundation

^oSupported by the DFG cluster of excellence ‘Origin and Structure of the Universe’ (www.universe-cluster.de)

^pSupported by EU FP7 (HadronPhysics3, Grant Agreement number 283286)

^qSupported by the Israel Science Foundation, founded by the Israel Academy of Sciences and Humanities

^rSupported by the Polish NCN Grant DEC-2011/01/M/ST2/02350

References

1. The COMPASS Collaboration, C. Adolph *et al.*, Eur. Phys. J. **C73** (2013) 2531.
2. P. Sun and F. Yuan, Phys. Rev. D **88** (2013) 11, 114012
3. M. Anselmino, M. Boglione, J. O. Gonzalez H., S. Melis and A. Prokudin, JHEP **1404** (2014) 005
4. I. Akushevich, H. Böttcher and D. Ryckbosch, “RADGEN 1.0: Monte Carlo generator for radiative events in DIS on polarized and unpolarized targets,” in “Hamburg 1998/1999, Monte Carlo generators for HERA physics” 554-565 [hep-ph/9906408].