



ALICE status report

Leonardo Milano

(CERN) on behalf of the ALICE Collaboration





New publications since last LHCC

PUBLISHED:

- Multiplicity dependence of jet-like two-particle correlations in p-Pb collisions at sqrt(s_NN) = 5.02 TeV (Phys. Lett. B 741 (2015) 38-50)
- Suppression of ψ(2S) production in p-Pb collisions at sqrt(s_NN)= 5.02 TeV (JHEP12(2014)073)
- Measurement of prompt D-meson production in p-Pb collisions at sqrt(sNN) = 5.02 TeV (PRL 113, 232301 (2014))
- Exclusive J/ ψ photoproduction off protons in ultra-peripheral p-Pb collisions at sqrt(s_NN) = 5.02 TeV (Phys. Rev. Lett. 113 (2014) 232504)
- Production of inclusive Y(1S) and Y(2S) in p-Pb collisions at sqrt(s_NN)=5.02 TeV (Phys. Lett. В 740 (2015) 105-117)
- Production of $\Sigma(1385)^{\pm}$ and $\Xi(1530)^{0}$ in proton-proton collisions at sqrt(s) = 7 TeV (Eur. Phys. J. C 75 (2015) 1)
- Measurement of electrons from semileptonic heavy-flavor hadron decays in pp collisions at sqrt(s)=2.76 TeV (Phys. Rev. D 91, 012001 (2015))







New publications since last LHCC

SUBMITTED and ACCEPTED:

- K*(892)⁰ and phi(1020) production in Pb-Pb collisions at sqrt(s_NN) = 2.76 TeV (accepted by Phys. ReV. C)
- Measurement of jet suppression in central Pb-Pb collisions at sqrt(s_NN) = 2.76 TeV (arXiv:1502.01689 [nucl-ex])
- Centrality dependence of particle production in p-Pb collisions at sqrt(s_NN)= 5.02 TeV (arXiv:1412.6828 [nucl-ex])
- Two-pion femtoscopy in p-Pb collisions at sqrt(s_NN)=5.02 TeV (arXiv: 1502.00559 [nucl-ex])
- Measurement of charged jet production cross sections and nuclear modification in p-Pb collisions at sqrt(s_NN)=5.02 TeV (arXiv:1503.00681 [nucl-ex])
- Forward-backward multiplicity correlations in pp collisions at sqrt(s)=0.9, 2.76 and 7 TeV (arXiv:1502.00230 [nucl-ex])
- Inclusive photon production at forward rapidities in pp collisions at sqrt(s) = 0.9, 2.76 and 7 TeV (arXiv:1411.4981 [nucl-ex])







CERN-PH-EP-2014-060 May 19, 2014

K^{*}(892)⁰ and ϕ (1020) production in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV

The ALICE Collaboration *

Abstract

The yields of the K*(892)⁰ and $\phi(1020)$ resonances are measured in Pb–Pb collisions at $\sqrt{s_{\rm NN}} = 2.76$ TeV through their hadronic decays using the ALICE detector. The measurements are performed in multiple centrality intervals at mid-rapidity (|y| < 0.5) in the transverse-momentum ranges $0.3 < p_T < 0.5$ 5 GeV/c for the K*(892)⁰ and $0.5 < p_T < 5$ GeV/c for the $\phi(1020)$. The yields of K*(892)⁰ are suppressed in central Pb-Pb collisions with respect to pp and peripheral Pb-Pb collisions. This suppression is discussed in a scenario in which the $K^*(892)^0$ decays during the evolution of the fireball and the decay products scatter, thus escaping detection through invariant-mass reconstruction. In contrast, the $\phi(1020)$ meson, due to its long lifetime, decays outside the fireball. These particles are also used as probes to study the mechanisms of particle production. The shape of the $p_{\rm T}$ distribution of the $\phi(1020)$ meson, but not its yield, is reproduced fairly well by hydrodynamical models for central Pb–Pb collisions. In central Pb–Pb collisions at low and intermediate $p_{\rm T}$, the p/ $\phi(1020)$ ratio is flat in $p_{\rm T}$, while the p/ π and $\phi(1020)/\pi$ ratios show a pronounced increase and have similar shapes to each other. These results indicate that the shapes of the $p_{\rm T}$ distributions of these particles in central Pb–Pb collisions are determined predominantly by the particle masses and radial flow. Finally, $\phi(1020)$ production in Pb–Pb collisions is enhanced, with respect to the yield in pp collisions and the yield of charged pions, by an amount similar to the Λ and Ξ .

PACS numbers: 25.75.Dw, 13.85.Ni, 14.40.Df, 14.40Be





arXiv:1404.0495 [nucl-ex]

Lifetime K^{*0} ~ **4** fm/c, Φ ~ **45** fm/c

Same order of magnitude as the system lifetime in heavy-ion collisions



Re-scattering



Regeneration



arXiv:1404.0495 [nucl-ex]

Lifetime K^{*0} ~ **4** fm/c, Φ ~ **45** fm/c

Same order of magnitude as the system lifetime in heavy-ion collisions



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arXiv:1404.0495 [nucl-ex]



Yield extrapolation (mainly at low p_T) using blast-wave function





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K^{*0}, Φ in Pb-Pb

arXiv:1404.0495 [nucl-ex]





arXiv:1404.0495 [nucl-ex]





arXiv:1404.0495 [nucl-ex]





arXiv:1404.0495 [nucl-ex]

blast-wave prediction using:

- β , T from π ,K,p fit
- yield from thermal model



Suppression mainly at low p_T weak p_T dependence



arXiv:1404.0495 [nucl-ex]

blast-wave prediction using:

- β , T from π ,K,p fit
- yield from thermal model





 $< p_T >$ of K*, Φ similar to protons, re-scattering doesn't change significantly the p_T distribution

Suppression mainly at low p_T weak p_T dependence



arXiv:1404.0495 [nucl-ex]



 Φ/p flat in p_T up to 5 GeV/c in central collisions! Clear change in dynamics with centrality

CÉRN)



0.4

0.3

0.2

0.1

/₂{SP,|Δη| > 0.9}

. - Ο π[±] arXiv:1404.0495 [nucl-ex]

ALICE 10-20% Pb-Pb $\sqrt{s_{NN}}$ = 2.76 TeV

ALICE, arXiv:1405.4632





 Φ/p flat in p_T up to 5 GeV/c in central collisions! Clear change in dynamics with centrality



arXiv:1404.0495 [nucl-ex]



 Φ/p flat in p_T up to 5 GeV/c in central collisions! Clear change in dynamics with centrality



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Jet energy loss in Pb-Pb







CERN-PH-EP-2015-023 30 January 2015

Measurement of jet suppression in central Pb–Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV

ALICE Collaboration*

Abstract

The transverse momentum $(p_{\rm T})$ spectrum and nuclear modification factor $(R_{\rm AA})$ of reconstructed jets in 0–10% and 10–30% central Pb–Pb collisions at $\sqrt{s_{\rm NN}} = 2.76$ TeV were measured. Jets were reconstructed from charged and neutral particles, utilizing the ALICE tracking detectors and Electromagnetic Calorimeter (EMCal), with the anti- $k_{\rm T}$ jet algorithm with a resolution parameter of R = 0.2. The jet $p_{\rm T}$ spectra are reported in the pseudorapidity interval of $|\eta_{iet}| < 0.5$ for $40 < p_{T, iet} < 120$ GeV/c in 0–10% and for $30 < p_{T, iet} < 100 \text{ GeV/}c$ in 10–30% collisions. Reconstructed jets were required to contain a leading charged particle with $p_{\rm T} > 5 \text{ GeV}/c$ to suppress jets constructed from the combinatorial background in Pb-Pb collisions. The effect of the leading charged particle requirement has been studied in both pp and Pb-Pb collisions and has been shown to have negligible effects on the R_{AA} within the uncertainties of the measurement. The nuclear modification factor is obtained by dividing the jet spectrum measured in Pb-Pb by that in pp collisions scaled by the number of independent nucleon-nucleon collisions estimated using a Glauber model. R_{AA} is found to be 0.28 ± 0.04 in 0-10% and 0.35 ± 0.04 in 10–30% collisions, independent of $p_{T, iet}$ within the uncertainties of the measurement. The observed suppression is in fair agreement with expectations from two model calculations with different approaches to jet quenching.

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Jet energy loss in Pb-Pb

arXiv:1502.01689 [nucl-ex]

Hard partons produced in the medium





Jet energy loss in Pb-Pb arXiv:1502.01689 [nucl-ex]

Hard partons produced in the medium



Jet suppression quantified by means of the RAA

 $R_{AA} =$







Jet energy loss in Pb-Pb

arXiv:1502.01689 [nucl-ex]



Strong suppression: $\langle R_{AA} \rangle \sim 0.28$ in 0-10% and 0.35 in 10-30% consistent with other LHC experiments

Particles with $p_T > 150$ MeV/c (E_T > 300 MeV for neutral) measured in ALICE, small correction from Jet energy scaling.

Well described by models at low $p_{T,jet}$



Jet energy loss in Pb-Pb



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Particles with $p_T > 150$ MeV/c (E_T > 300 MeV for neutral) measured in ALICE, small correction from Jet energy scaling.

Well described by models at low $p_{T,jet}$



Jet energy loss in p-Pb

arXiv:1503.00681 [nucl-ex]





CERN-PH-EP-2015-040 24 February 2015

Measurement of charged jet production cross sections and nuclear modification in p–Pb collisions at $\sqrt{s_{\rm NN}}=5.02~TeV$

ALICE Collaboration*

Abstract

Charged jet production cross sections in p–Pb collisions at $\sqrt{s_{\text{NN}}} = 5.02$ TeV measured with the ALICE detector at the LHC are presented. Using the anti- k_{T} algorithm, jets have been reconstructed in the central rapidity region from charged particles with resolution parameters R = 0.2 and R = 0.4. The reconstructed jets have been corrected for detector effects and the underlying event background. To calculate the nuclear modification factor, R_{pPb} , of charged jets in p–Pb collisions, a pp reference was constructed by scaling previously measured charged jet spectra at $\sqrt{s} = 7$ TeV. In the transverse momentum range $20 \le p_{\text{T,ch jet}} \le 120 \text{ GeV/}c$, R_{pPb} is found to be consistent with unity, indicating the absence of strong nuclear matter effects on jet production. Major modifications to the radial jet structure are probed via the ratio of jet production cross sections reconstructed with the two different resolution parameters. This ratio is found to be similar to the measurement in pp collisions at $\sqrt{s} = 7$ TeV and to the expectations from PYTHIA pp simulations and NLO pQCD calculations at $\sqrt{s_{\text{NN}}} = 5.02$ TeV.





Jet energy loss in p-Pb

arXiv:1503.00681 [nucl-ex]



CERN-PH-EP-2015-040 24 February 2015

Measurement of charged jet production cross sections and nuclear modification in p–Pb collisions at $\sqrt{s_{\rm NN}}=5.02~TeV$

ALICE Collaboration*

Abstract

Charged jet production cross sections in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV measured with the ALICE detector at the LHC are presented. Using the anti- k_T algorithm, jets have been reconstructed in the central rapidity region from charged particles with resolution parameters R = 0.2 and R = 0.4. The reconstructed jets have been corrected for detector effects and the underlying event background. To calculate the nuclear modification factor, R_{pPb} , of charged jets in p–Pb collisions, a pp reference was constructed by scaling previously measured charged jet spectra at $\sqrt{s} = 7$ TeV. In the transverse momentum range $20 \le p_{T, ch jet} \le 120$ GeV/*c*, R_{pPb} is found to be consistent with unity, indicating the absence of strong nuclear matter effects on jet production. Major modifications to the radial jet structure are probed via the ratio of jet production cross sections reconstructed with the two different resolution parameters. This ratio is found to be similar to the measurement in pp collisions at $\sqrt{s} = 7$ TeV and to the expectations from PYTHIA pp simulations and NLO pQCD calculations at $\sqrt{s_{NN}} = 5.02$ TeV.

ب⁴⁰ 5 و <mark>1.8</mark> 1.8 ALICE p-Pb $\sqrt{s_{NN}} = 5.02 \text{ TeV}$ Charged jets, anti- $k_{\rm T}$, $|\eta_{\rm lab}| < 0.5$ 1.6 Reference: Scaled pp jets 7 TeV 1.4 Global normalization uncertainty 1.2 0.8 0.6 0.4 0.2 Resolution parameter R = 0.20 100 60 80 120 40 20 $p_{T, ch jet} (GeV/c)$

No Suppression in MB p-Pb collisions

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CERN-PH-EP-2014-281 17 November 2014

Centrality dependence of particle production in p–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV

ALICE Collaboration *

Abstract

We report measurements of the primary charged particle pseudorapidity density and transverse momentum distributions in p–Pb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV, and investigate their correlation with experimental observables sensitive to the centrality of the collision. Centrality classes are defined using different event activity estimators, i.e. charged particle multiplicities measured in three disjunct pseudorapidity regions as well as the energy measured at beam rapidity (zero-degree). The procedures to determine the centrality, quantified by the number of participants (N_{part}) , or the number of nucleon-nucleon binary collisions (N_{coll}) , are described. We show that, in contrast to Pb–Pb collisions, in p–Pb collisions large multiplicity fluctuations together with the small range of participants available, generate a dynamical bias in centrality classes based on particle multiplicity. We propose to use the zero-degree energy, which we expect not to introduce a dynamical bias, as an alternative event-centrality estimator. Based on zero-degree energy centrality classes, the N_{part} dependence of particle production is studied. Under the assumption that the multiplicity measured in the Pb-going rapidity region scales with the number of Pb-participants, an approximate independence of the multiplicity per participating nucleon measured at midrapitity of the number of participating nucleons is observed. Furthermore, at high- $p_{\rm T}$ the p–Pb spectra are found to be consistent with the pp spectra scaled by N_{coll} for all centrality classes. Our results represent valuable input for the study of the event activity dependence of hard probes in p-Pb collision and, hence, help to establish baselines for the interpretation of the Pb-Pb data.



arXiv:1412.6828 [nucl-ex]

Not easy to define $\langle N_{coll} \rangle$ in the case of p-Pb

$$R_{\rm pPb}(p_{\rm T}, {\rm cent}) = \frac{{\rm d}N_{\rm cent}^{\rm pPb}/{\rm d}p_{\rm T}}{\langle N_{\rm coll}^{\rm cent}\rangle {\rm d}N^{\rm pp}/{\rm d}p_{\rm T}}$$



arXiv:1412.6828 [nucl-ex]

Not easy to define $\langle N_{coll} \rangle$ in the case of p-Pb

$$R_{\rm pPb}(p_{\rm T}, {\rm cent}) = \frac{{\rm d}N_{\rm cent}^{\rm pPb}/{\rm d}p_{\rm T}}{\langle N_{\rm coll}^{\rm cent} \rangle {\rm d}N^{\rm pp}/{\rm d}p_{\rm T}}$$

Multiplicity bias







Not easy to define $\langle N_{coll} \rangle$ in the case of p-Pb

$$R_{\rm pPb}(p_{\rm T}, {\rm cent}) = \frac{{\rm d}N_{\rm cent}^{\rm pPb}/{\rm d}p_{\rm T}}{\langle N_{\rm coll}^{\rm cent} \rangle {\rm d}N^{\rm pp}/{\rm d}p_{\rm T}}$$

80%

10

60%

 10^{2}







Not easy to define $\langle N_{coll} \rangle$ in the case of p-Pb

$$R_{\rm pPb}(p_{\rm T}, {\rm cent}) = \frac{{\rm d}N_{\rm cent}^{\rm pPb}/{\rm d}p_{\rm T}}{\langle N_{\rm coll}^{\rm cent}\rangle {\rm d}N^{\rm pp}/{\rm d}p_{\rm T}}$$







arXiv:1412.6828 [nucl-ex]

$$Q R_{pPb}(p_{T}, cent) = \frac{dN_{cent}^{pPb}/dp_{T}}{\langle N_{coll}^{cent} \rangle dN^{pp}/dp_{T}}$$





arXiv:1412.6828 [nucl-ex]





Strong biases predicted Glauber+Pythia model

ALI-PREL-84826







 $\mathbf{Q} \mathbf{R}_{\text{pPb}}(p_{\text{T}}, \text{cent}) = \frac{dN_{\text{cent}}^{\text{pPb}}/dp_{\text{T}}}{\langle N_{\text{coll}}^{\text{cent}} \rangle dN^{\text{pp}}/dp_{\text{T}}}$



Strong biases predicted Glauber+Pythia model

ALI-PREL-79629

Cronin enhancement not reproduced by model: Cold(?) Nuclear Matter effect



arXiv:1412.6828 [nucl-ex]





ALI-PREL-79629

Cronin enhancement not reproduced by model: Cold(?) Nuclear Matter effect

ZNA has the smallest bias: far from midrapidity

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Hybrid method:

- multiplicity in the Pb-going side proportional to $N_{\mbox{coll}}$
- multiplicity at midrapidity proportional to N_{part}

$$\langle N_{\text{coll}} \rangle_{i} = \langle N_{\text{coll}} \rangle_{MB} \cdot \frac{\langle S \rangle_{i}}{\langle S \rangle_{MB}}$$

$$\langle N_{\text{part}} \rangle_{i} = \langle N_{\text{part}} \rangle_{\text{MB}} \cdot \left(\frac{\langle dN/d\eta \rangle_{i}}{\langle dN/d\eta \rangle_{\text{MB}}} \right)_{-1 < \eta < 0}$$



Hybrid method:

- multiplicity in the Pb-going side proportional to N_{coll}
- multiplicity at midrapidity proportional to N_{part}

$$\langle N_{\text{coll}} \rangle_{i} = \langle N_{\text{coll}} \rangle_{MB} \cdot \frac{\langle S \rangle_{i}}{\langle S \rangle_{MB}}$$
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arXiv:1412.6828 [nucl-ex]





arXiv:1412.6828 [nucl-ex]

- Hybrid method:
 - multiplicity in the Pb-going side proportional to N_{coll}
 - multiplicity at midrapidity proportional to N_{part}

$$\langle N_{\text{coll}} \rangle_{i} = \langle N_{\text{coll}} \rangle_{MB} \cdot \frac{\langle S \rangle_{i}}{\langle S \rangle_{MB}}$$

$$\langle N_{\text{part}} \rangle_{i} = \langle N_{\text{part}} \rangle_{\text{MB}} \cdot \left(\frac{\langle dN/d\eta \rangle_{i}}{\langle dN/d\eta \rangle_{\text{MB}}} \right)_{-1 < n < 0}$$





arXiv:1502.00559 [nucl-ex]







CERN-PH-EP-2015-019 30 January 2015

Two-pion femtoscopy in p–Pb collisions at $\sqrt{s_{\rm NN}}=5.02~TeV$

ALICE Collaboration*

Abstract

We report the results of the femtoscopic analysis of pairs of identical pions measured in p–Pb collisions at $\sqrt{s_{\text{NN}}} = 5.02$ TeV. Femtoscopic radii are determined as a function of event multiplicity and pair momentum in three spatial dimensions. As in the pp collision system, the analysis is complicated by the presence of sizable background correlation structures in addition to the femtoscopic signal. The radii increase with event multiplicity and decrease with pair transverse momentum. When taken at comparable multiplicity, the radii measured in p–Pb collisions, at high multiplicity and low pair transverse momentum, are 10–20% higher than those observed in pp collisions but below those observed in A–A collisions. The results are compared to hydrodynamic predictions at large event multiplicity as well as discussed in the context of calculations based on gluon saturation.



arXiv:1502.00559 [nucl-ex]

Two-particle correlations of identical pions



 $\mathbf{q} = \mathbf{p}_2 - \mathbf{p}_1$ calculated in the Longitudinal Co-Moving System

Related to the size of the "region of homogeneity" in three directions:





arXiv:1502.00559 [nucl-ex]





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arXiv:1502.00559 [nucl-ex]

Shape depends on $k_T = \langle |p_{T,1} + p_{T,2}|/2 \rangle$, multiplicity

$$C(\mathbf{q}) = \int S(r,\mathbf{q}) |\Psi(\mathbf{q},r)|^2 d^4 r,$$

Source emissions function:

- Gaussian
- Exponential (out, long)
 - + Gaussian (side)

Interaction kernel (symmetrized Coulomb wave function)

+ non femtoscopic (mini-jets) structures at large $q=|\mathbf{q}|$, from Monte Carlo templates





arXiv:1502.00559 [nucl-ex]



<dN_{ch}/dη $>^{1/3}$ used as proxy for the system size scaling ~ linear



arXiv:1502.00559 [nucl-ex]



 $<dN_{ch}/d\eta>^{1/3}$ used as proxy for the system size scaling ~ linear

Similar values at low multiplicity, different scaling Same for "long" and "side" directions

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arXiv:1502.00559 [nucl-ex]





 $<dN_{ch}/d\eta>^{1/3}$ used as proxy for the system size scaling ~ linear

Similar values at low multiplicity, different scaling Same for "long" and "side" directions

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More news from pp

Measurement of electrons from semileptonic heavy-flavor hadron decays in pp collisions at $\sqrt{s} = 2.76$ TeV

The ALICE Collaboration^{*} Phys. Rev. D 91, 012001 (2015)





More news from pp

Measurement of electrons from semileptonic heavy-flavor hadron decays in pp collisions at $\sqrt{s}=2.76~\text{TeV}$

The ALICE Collaboration^{*} Phys. Rev. D 91, 012001 (2015)

Forward-backward multiplicity correlations in pp collisions at $\sqrt{s} = 0.9, 2.76$ and 7 TeV

ALICE Collaboration*

arXiv:1502.00230 [nucl-ex]





More news from pp

Measurement of electrons from semileptonic heavy-flavor hadron decays in pp collisions at $\sqrt{s}=2.76~\text{TeV}$

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Forward-backward multiplicity correlations in pp collisions at $\sqrt{s} = 0.9, 2.76$ and 7 TeV

ALICE Collaboration* arXiv:1502.00230 [nucl-ex]

Production of $\Sigma(1385)^\pm$ and $\Xi(1530)^0$ in proton-proton collisions at $\sqrt{s}=7~{\rm TeV}$

The ALICE Collaboration*

Eur. Phys. J. C 75 (2015) 1



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News from P2



ALICE detector - TRD completed



121st LHCC meeting - March 2015



ALICE detector - DCAL installation



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ALICE detector - Ready for operation





L3 doors closed - Dec 2014

Re-installation of UX25 shielding - Dec 2014



Upgrade: ALICE Muon Forward Tracker



Draft sent to the LHCC referees on January 18th 2015. CDS link: http://cds.cern.ch/record/1981898

Muon Spectrometer \mathbf{R}_{AA} Non-prompt $\begin{tmatrix} B \to K\pi^+ \ (lyl < 0.9) \end{tmatrix}$ Non-prompt $d\phi \rightarrow \mu\mu$ (3.6<y<4.5) 1.5 ALICE Upgrade $L_{int} = 10 \text{ nb}^1$ $\sqrt{s_{NN}} = 5.5 \text{ TeV}$ 0-5% Pb-Pb 0.5 Afrighthan 1997 0

5

15

10

20

25

30

p_{_} [GeV/c]







Still data from RUN I to be analyzed



- 7 new publications
- 6 papers submitted

- 1 paper accepted for publication
- several contributions to conference proceedings



Summary



Still data from RUN I to be analyzed



- 7 new publications
- 6 papers submitted
- 1 paper accepted for publication
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READY for RUN II



...we are actually already running, 101 muons in ALICE!





Summary



Still data from RUN I to be analyzed



- 7 new publications
- 6 papers submitted
- 1 paper accepted for publication
- several contributions to conference proceedings

READY for RUN II



...we are actually already running, 101 muons in ALICE!



Looking at the future



Upgrade operations ongoing









Run II will be exciting, stay tuned! Thank you!





Backup slides



Multi-parton interactions (MPI) in p-Pb



	Contents lists available at ScienceDirect	PHYSICS LETTERS B
2-52 20	Physics Letters B	
ELSEVIER	www.elsevier.com/locate/physletb	

Multiplicity dependence of jet-like two-particle correlation structures in p–Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV

CrossMark

ALICE Collaboration*

ARTICLE INFO

ABSTRACT

Article history:

Received 23 June 2014 Received in revised form 8 October 2014 Accepted 15 November 2014 Available online 20 November 2014 Editor: L. Rolandi Two-particle angular correlations between unidentified charged trigger and associated particles are measured by the ALICE detector in p–Pb collisions at a nucleon–nucleon centre-of-mass energy of 5.02 TeV. The transverse-momentum range $0.7 < p_{T,assoc} < p_{T,trig} < 5.0 \text{ GeV}/c$ is examined, to include correlations induced by jets originating from low momentum-transfer scatterings (minijets). The correlations expressed as associated yield per trigger particle are obtained in the pseudorapidity range $|\eta| < 0.9$. The near-side long-range pseudorapidity correlations observed in high-multiplicity p–Pb collisions are subtracted from both near-side short-range and away-side correlations in order to remove the non-jet-like components. The yields in the jet-like peaks are found to be invariant with event multiplicity with the exception of events with low multiplicity. This invariance is consistent with the particles being produced via the incoherent fragmentation of multiple parton–parton scatterings, while the yield related to the previously observed ridge structures is not jet-related. The number of uncorrelated sources of particle production is found to increase linearly with multiplicity, suggesting no saturation of the number of multi-parton interactions even in the highest multiplicity p–Pb collisions. Further, the number scales only in the intermediate multiplicity region with the number of binary nucleon–nucleon collisions estimated with a Glauber Monte-Carlo simulation.

Phys. Lett. B 741 (2015) 38-50

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Multi-parton interaction (MPI) in p-Pb



Phys. Lett. B 741 (2015) 38-50

Long-range correlations removed from the jet peak to study the jet-like structures



Peak region - Ridge region



yield from the subtracted distribution

 $\langle N_{\rm assoc,nearside} \rangle \langle N_{\rm assoc,awayside} \rangle$



ALICE, JHEP 09 (2013) 049

121st LHCC meeting - March 2015

ALICE, Phys. Lett. B 741 (2015) 38-50





arXiv:1502.00559 [nucl-ex]

general decrease with $k_{\rm T}$ in data and models

- at low kT pp has a ~10-20% smaller radius
- Model comparison suggests a *compact*configuration of energy deposition *k*^T slope reproduced

Similar conclusions from Exponential + Gaussian source assumption



Multi-parton interaction (MPI) in p-Pb

Phys. Lett. B 741 (2015) 38-50

How is the multiplicity generated in p-Pb collisions?

Long-range correlations removed from the jet peak to study the jet-like structures





Peak region Ridge region - <Nassoc, nearside> shows a plateau

- consistent with picture where high multiplicity is an incoherent fragmentation of parton-parton collisions

- double-ridge unrelated minijet production?



FB multiplicity correlations in pp



arXiv:1502.00230 [nucl-ex]











Electrons from heavy flavour decays

Phys. Rev. D 91, 012001 (2015)





$\Sigma(1385)^{\pm}$ and Ξ^0 in pp

Eur. Phys. J. C 75 (2015) 1

	Valence quarks	Mass (MeV/c^2)	$\mathrm{Width}/c\tau$	Decay channel	Branching ratio (%)
$\Sigma(1385)^{+}$	uus	1382.80 ± 0.35	$(36.0 \pm 0.7) \text{ MeV}/c^2$	$\Lambda + \pi^+$	87.0 ± 1.5
$\Sigma(1385)^{-}$	dds	1387.2 ± 0.5	$(39.4 \pm 2.1) \text{ MeV}/c^2$	$\Lambda + \pi^-$	87.0 ± 1.5
$\Xi(1530)^{0}$	uss	1531.80 ± 0.32	$(9.1 \pm 0.5) \text{ MeV}/c^2$	$\Xi^- + \pi^+$	66.7
Ξ^{-}	dss	1321.71 ± 0.07	4.91 cm	$\Lambda + \pi^-$	99.887 ± 0.035
Λ	uds	1115.683 ± 0.006	7.89 cm	$p+\pi^-$	63.9 ± 0.5

