Status of ALICE India FoCal simulations

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NISER, India

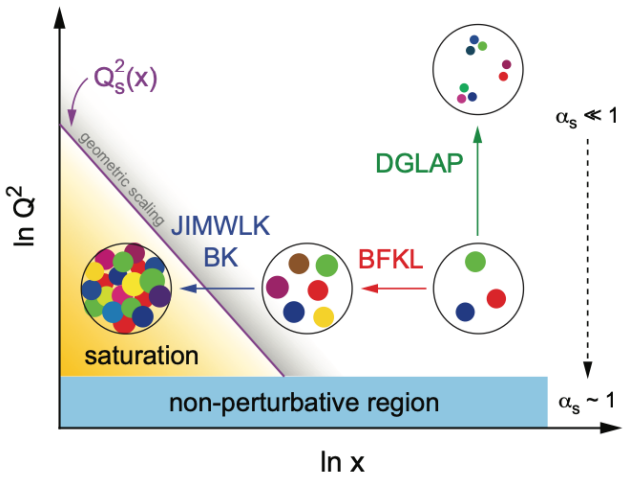
ALICE-STAR India collaboration Meeting, 24-27th June 2024

Outline

- FoCal physics and simulation
  - Direct photons
  - jets
- ALICE India simulation effort
  - Letter of Intent
  - Contributions in physics performance note
  - Analysis not making to physics performance note
- FOCAL simulation efforts in future directions

Small x physics: FoCal

Gluon Saturation in Nucli:
Measurement at forward rapidity



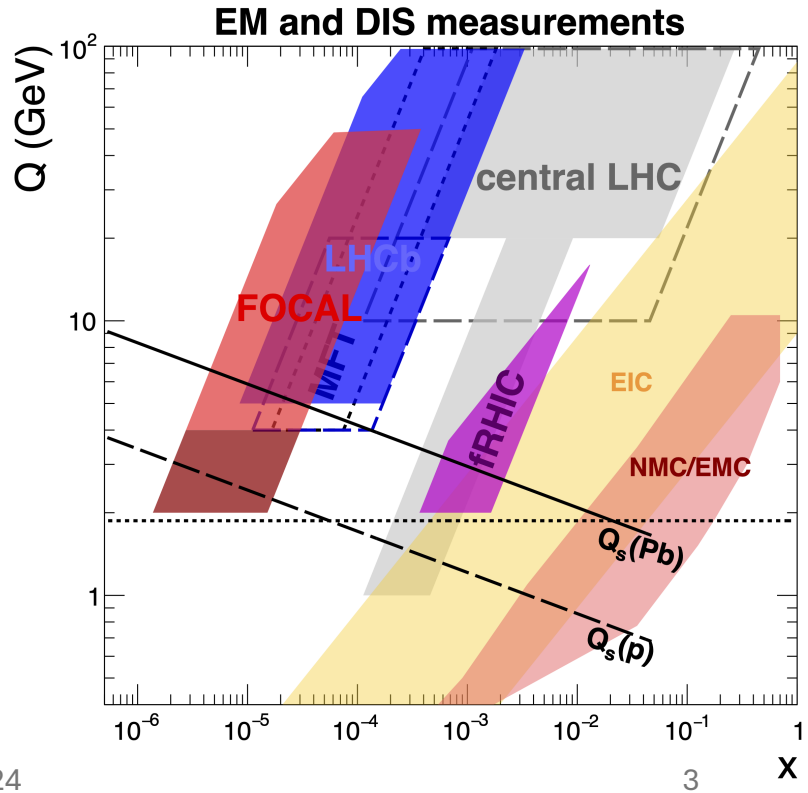
$$Q^2_{\mathrm{sat}} \approx \frac{x g_A(x,Q^2)}{\pi R_A^2} \propto A^{1/3} x^{-\lambda}$$

$$x_{1,2} \approx \frac{2p_T \exp(\pm y)}{\sqrt{s}}, \quad (\lambda \approx 0.03)$$

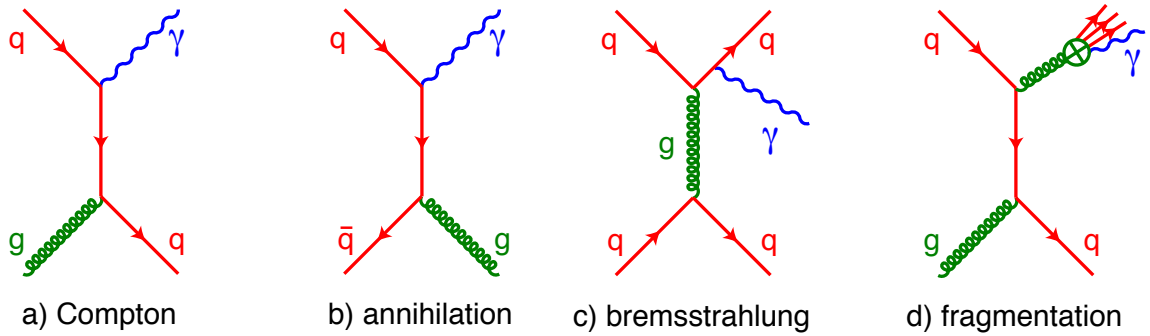
Nucl. Phys. B188 (1981) 555–576
Nucl. Phys. B268 (1986) 427–452

observables:

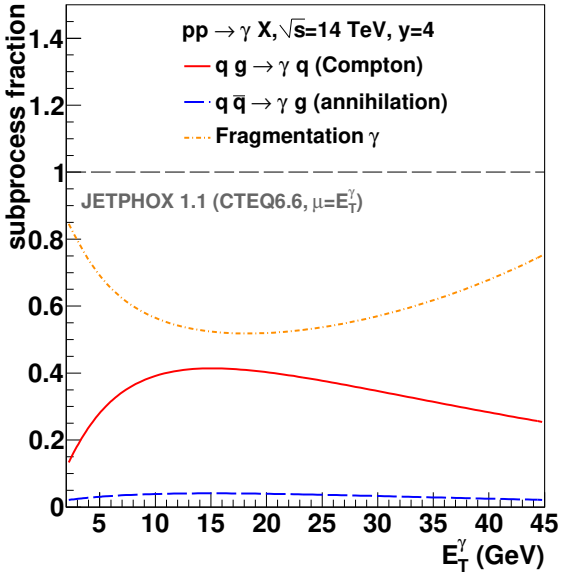
- **inclusive isolated photon production** (has not yet been calculated at NLO but necessary theoretical tools are in place)
- **isolated photon+jet** (same as inclusive isolated photons)
- **inclusive jets**
- **dijet photoproduction in UPCs**
- **cross section ratios of J/ψ and ψ(2S) production on ion vs. on proton targets in UPCs** Observables which require additional developments.
- **γ-π⁰ correlation**: calculation of the partonic-level process only requires the dipole cross section, but the π⁰ Fragmentation Function presents an additional uncertainty which is harder to control theoretically. *This channel could be reclassified as "cleanly interpretable" if there is sufficient theoretical confidence in the π⁰ FF at NLO.*
- **di-jets and dihadrons**: quadrupole evolution at NLO needs to be constructed and solved. This is doable in principle but is numerically complex- a dedicated theory effort is needed.
- **the cross-section ratio for exclusive production of J/ψ and ψ(2S) in UPCs**. The main uncertainty is the scale dependence at NLO.

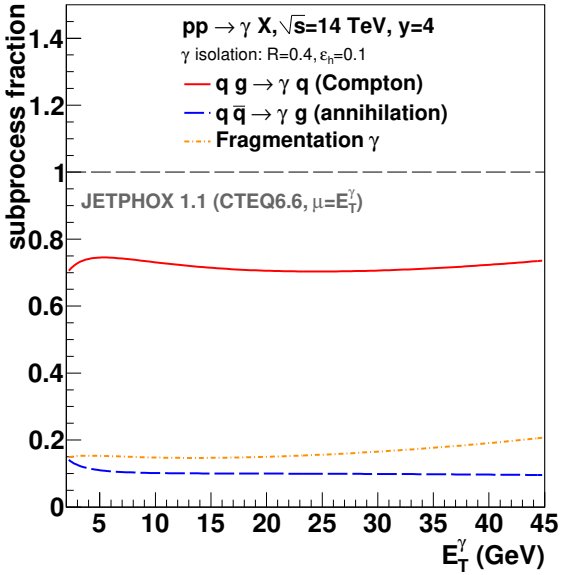


Direct photon and π^0 production



Isolation criteria used to eliminate fragmentation photon contributions

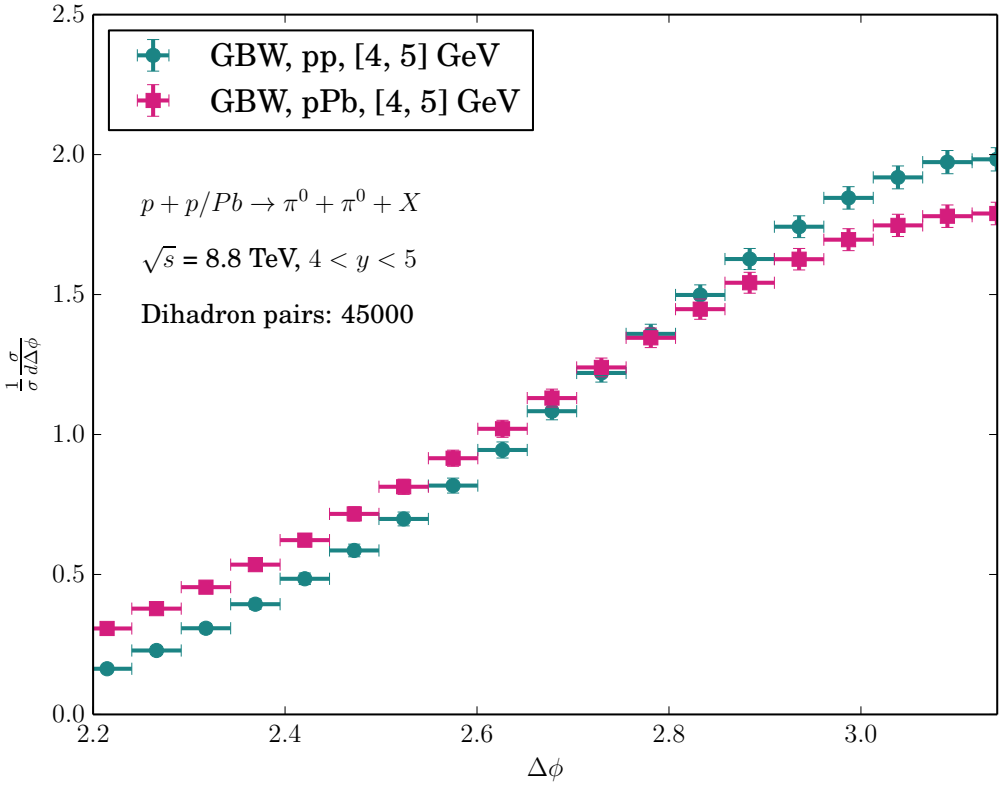




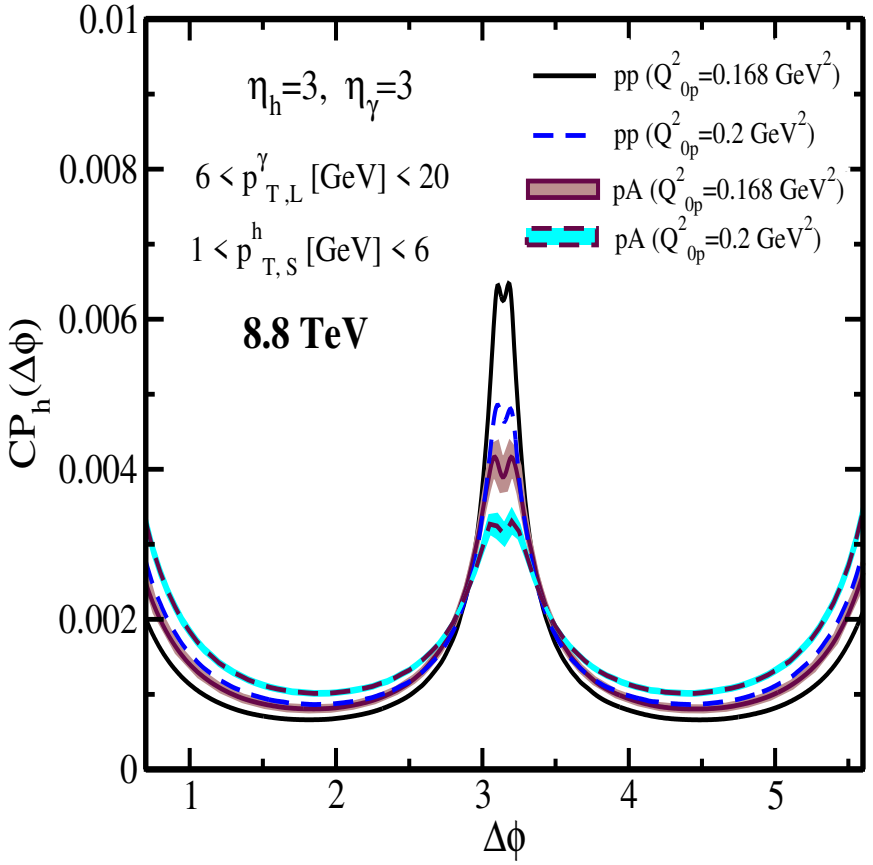
Relative contributions without(left) and with(right) **isolation** of the Compton, annihilation, and fragmentation subprocesses in NLO direct photon production in pp collisions at $\sqrt{s}$ = 14 TeV at the LHC at forward rapidity obtained with JETPHOX.

Phys. Rev. D **82**, 014015

Photon and hadron-triggered correlations



Prediction of azimuthal angular distributions of $\pi^0+\pi^0$ pairs in p+p and p+Pb collisions at $\sqrt{s_{NN}}$=8.8 TeV [*Phys. Lett.* B784 (2018)]



Prediction of γ–π^0 correlations as a function of azimuthal angle difference at forward rapidity, in minimum-bias p+A and p+p collisions at $\sqrt{s_{NN}}$=8.8 TeV, using a CGC approach with the running coupling BK equation and various initial saturation scales [*Phys. Rev.* D86 (2012) 094016].

Jets, γ+jet, and di-jets

https://doi.org/10.1007/JHEP07(2022)041
10.1007/JHEP12(2016)034

Forward inclusive jet production has been calculated within the dilute-dense CGC framework at NLO, utilizing the dipole scattering amplitude

H. Mäntysaari and H. Paukkunen, "Saturation and forward jets in proton-lead collisions at the LHC," *Phys. Rev. D* 100 no. 11, (2019) 114029, arXiv:1910.13116 [hep-ph].
H.-y. Liu, K. Xie, Z. Kang, and X. Liu, "Single inclusive jet production in pA collisions at NLO in the small-x regime," *JHEP* 07 (2022) 041, arXiv:2204.03026 [hep-ph].
L. Wang, L. Chen, Z. Gao, Y. Shi, S.-Y. Wei, and B.-W. Xiao, "Forward Inclusive Jet Productions in pA Collisions," arXiv:2211.08322 [hep-ph].

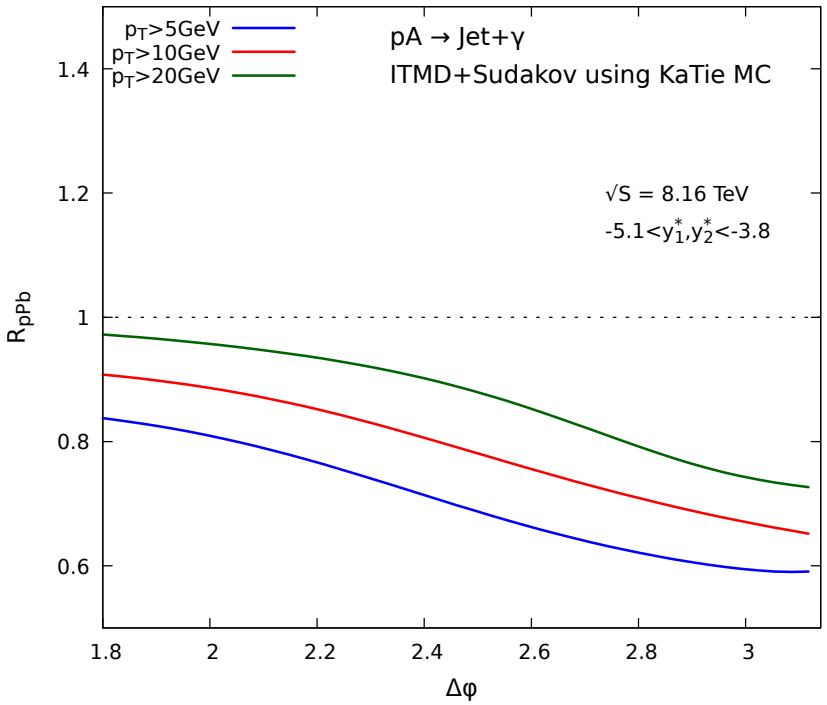
While the effect of multiple scattering of the projectile parton in the CGC is to induce additional $k^T \sim Q_{sat}$, such effects are significant only for very low-p_T jets (experimentally challenging)

Q_{sat}, which characterizes gluon-saturated matter at small-x; p_{jet} of the individual jets in the pair; and the momentum imbalance k_T of the di-jet pair, which also corresponds to the transverse momentum of the small-x gluons involved in the hard scattering $Q_{sat} \sim k_T \ll p_{jet}$, non-linear effects persist and several different TMD distributions (region of interest)

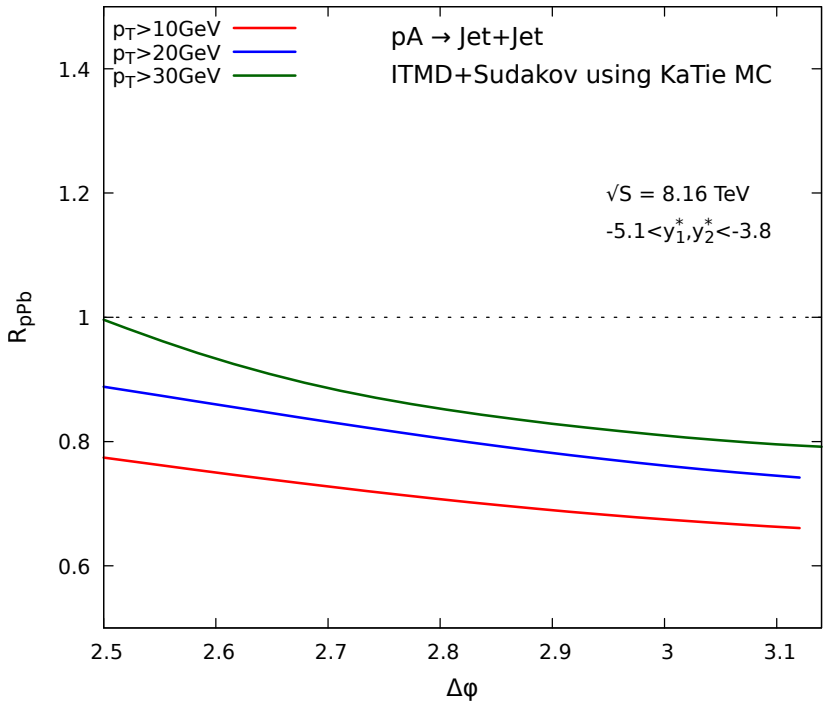
The di-jet channel is therefore promising approach to studying parton saturation, whose effects may be observable by varying k_T between p_{jet} and Q_{sat} .

Jets, γ+jet, and di-jets: R_{pPb} dependence on Δφ

γ+jet



di-jet channel



Using the KaTie MC code:
arXiv:2210.06613

KaTie is based on improved TMD (ITMD) factorization approach, whose domain of validity is $Q_{sat} \ll p_T^{jet}$.

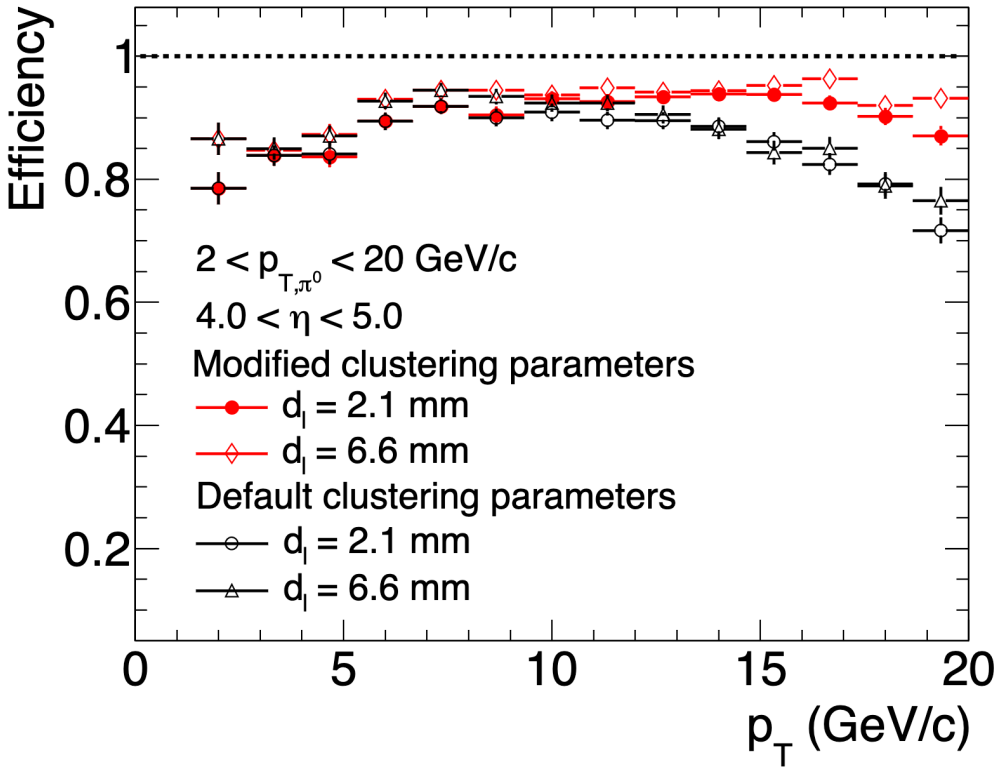
FoCal ALICE India simulation effort

(FoCal): Letter of Intent contribution (NISER)

- Shower profile studies
- Improved cluster extractions
- Various detector configurations : Air gaps

LOI NISER contribution: Neutral pion reconstruction performance and shower shape parameterization for various detector configurations.

ALICE-PUBLIC-2019-005 06 June 2020



FoCal simulation topics in physics performance note from ALICE India Collaboration

- Correlations with direct photons, π^0 and charged tracks
  - ✓γ_{dir}-π^0 correlations in FoCal
  - ✓π^0-hadron correlations (π^0 in FoCal and MC particles in barrel)
- Jet reconstruction performance in FoCal
  - ✓Jet energy resolution in pp and Pb and Underlying event subtraction
  - ✓Dijet correlations and scattering cross section ratio
- π^0, η and ω reconstruction performance
  - ✓p+p - π^0, η and ω
  - ✓Pb+Pb - π^0

Groups working for Physics performance note

Institutes	Topic	Contributors
IIT Indore	(i) Jet reconstruction (pp, p-Pb) single and di-jet reconstruction performance (ii) Ω reconstruction in pp, pPb, PbPb	Debedatta Behera and Kshitish Pradhan (PhD students) Shankar Nair (2nd yr. student)
IIT Bombay	(i) Misalignment studies in technical simulations (ii) Two-particle correlations (p-Pb): FOCAL-barrel: π^0– hadron	Akash Pandey (Postdoctoral Fellow)
Panjab University	Performance for π^0, η, Ω in Pb-Pb	Sandeep Dudi and Anjali Sharma (PhD students)
NISER	(i) Two-particle correlations (pp), FOCAL-FOCAL γ-π^0 (ii) Photo-production in ultra-peripheral collisions (Pb-Pb) - dijets	Mriganka M. Mondal (Research Physicist) Ranbir Singh (Staff Scientist)

Weekly meeting time : Wednesday 5:00 pm (IST)

https://indico.cern.ch/category/15715/ (Indico meeting link)

γ_{dir}–π^0 correlations in pp@14 TeV

Mriganka M Mondal & Ranbir Singh, NISER

https://twiki.cern.ch/twiki/bin/viewauth/ALICE/FOCALSoftware

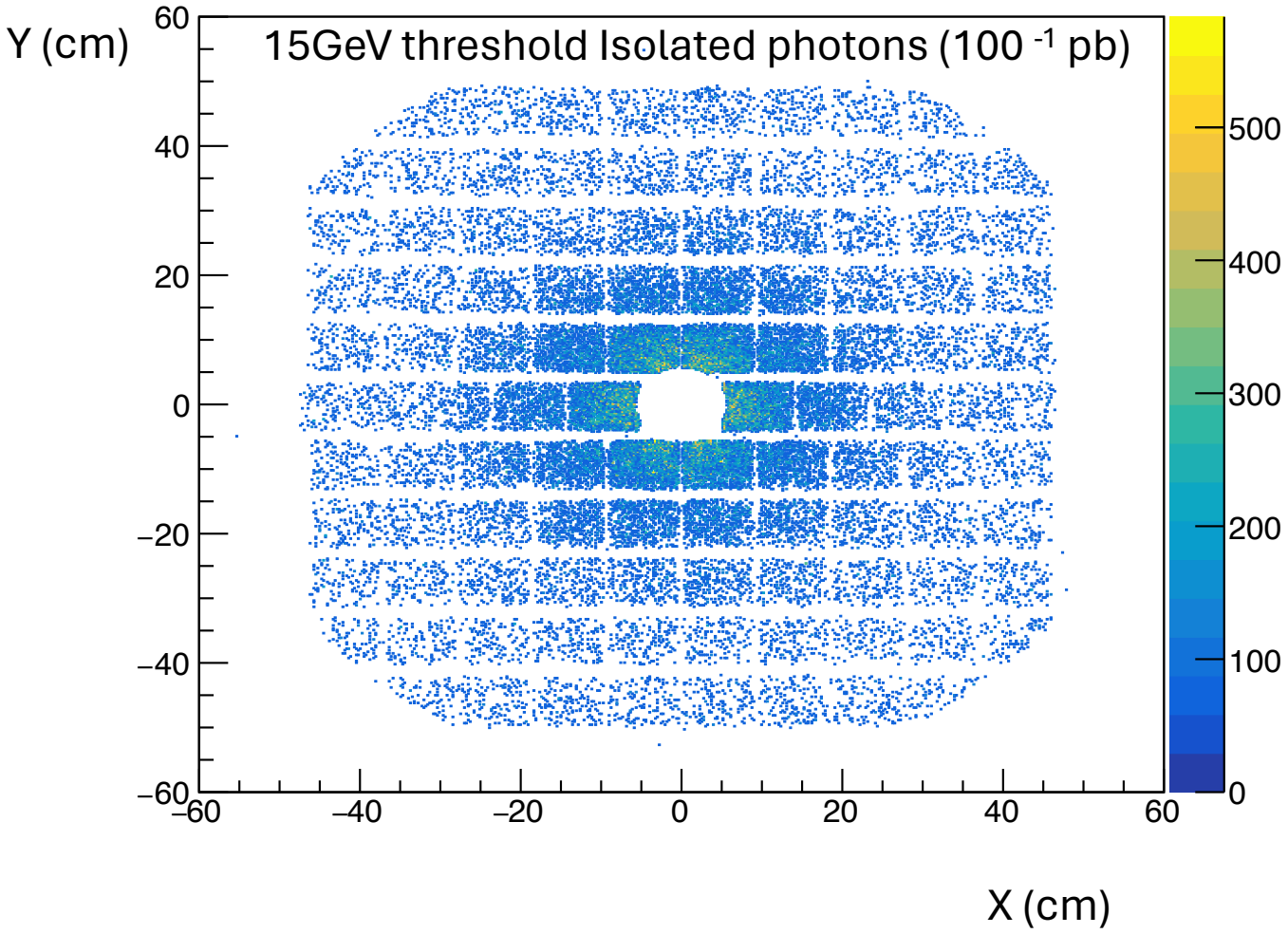
pythia pp, isolated direct photon pt>5 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_gammajet_trig	50000	v1.10/pythiaTriggered/isolatedGammaPt05
pythia pp, isolated direct photon pt>10 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_gammajet_trig	50000	v1.10/pythiaTriggered/isolatedGammaPt10
pythia pp, isolated direct photon pt>15 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_gammajet_trig	50000	v1.10/pythiaTriggered/isolatedGammaPt15
pythia pp, fragmentation photon pt>5 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_dirgamma_trig	50000	v1.10/pythiaTriggered/fragmentationGammaPt05
pythia pp, fragmentation photon pt>10 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_dirgamma_trig	50000	v1.10/pythiaTriggered/fragmentationGammaPt10
pythia pp, fragmentation photon pt>15 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_dirgamma_trig	50000	v1.10/pythiaTriggered/fragmentationGammaPt15
pythia pp, decay photon pt>5 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_MBtrig	50000	v1.10/pythiaTriggered/decayGammaPt05
pythia pp, decay photon pt>10 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_MBtrig	50000	v1.10/pythiaTriggered/decayGammaPt15
pythia pp, decay photon pt>15 GeV/c	v1.10	3	6	Upgrade:FOCAL_Generators:pythia_MBtrig	50000	v1.10/pythiaTriggered/decayGammaPt10

Signal : Isolated direct photon (γ_{dir} p_T thresholds = 5, 10, 15 GeV/c)
Background : Decay photon (γ p_T thresholds = 5, 10, 15 GeV/c)

200K samples in each threshold – combined and scaled according to 100 $^{-1}$ pb

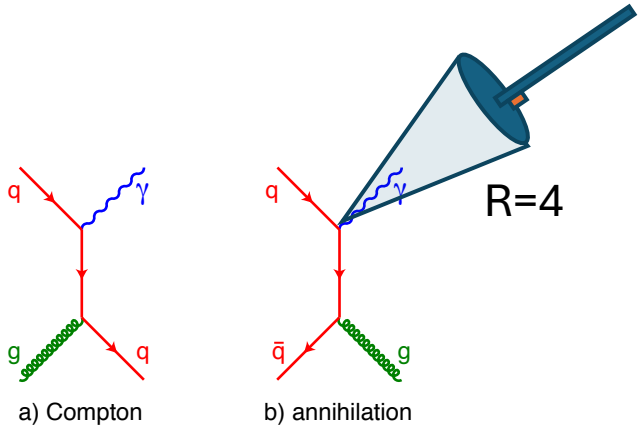
Latest FoCal library v1.11 is used

Isolated clusters



(true photon positions)

Isolated Clusters

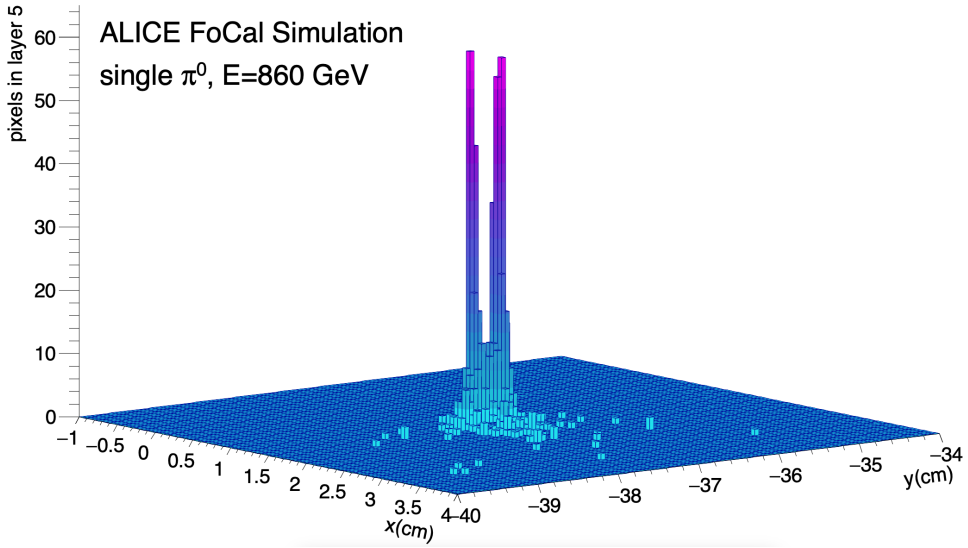


Isolated cluster : γ_{dir} has minimal energy around it.

$\mathbf{E_{T,iso}}$ (R4) = summed transverse energy around a cluster with come of R=0.4

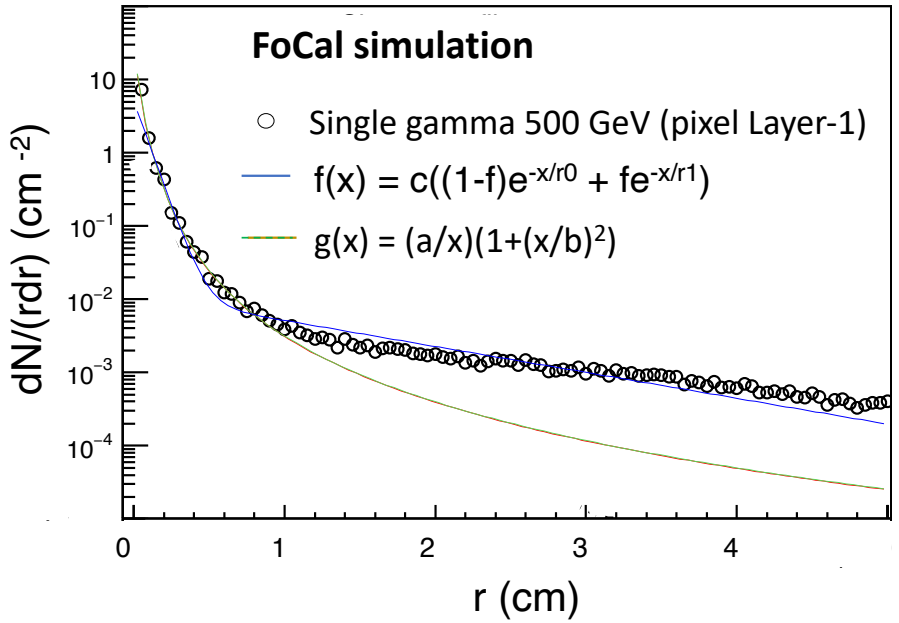
Simulations and Reconstruction

- simulation chain based on ALICE software : AliRoot + GEANT3
- The chain consists of a physics event generator, a detector model, a particle transport model, and reconstruction from raw signals (hits) to high-level physics analysis objects, such as energy calibrated clusters



Event display for a resolved single π^0 event with an energy of 860 GeV

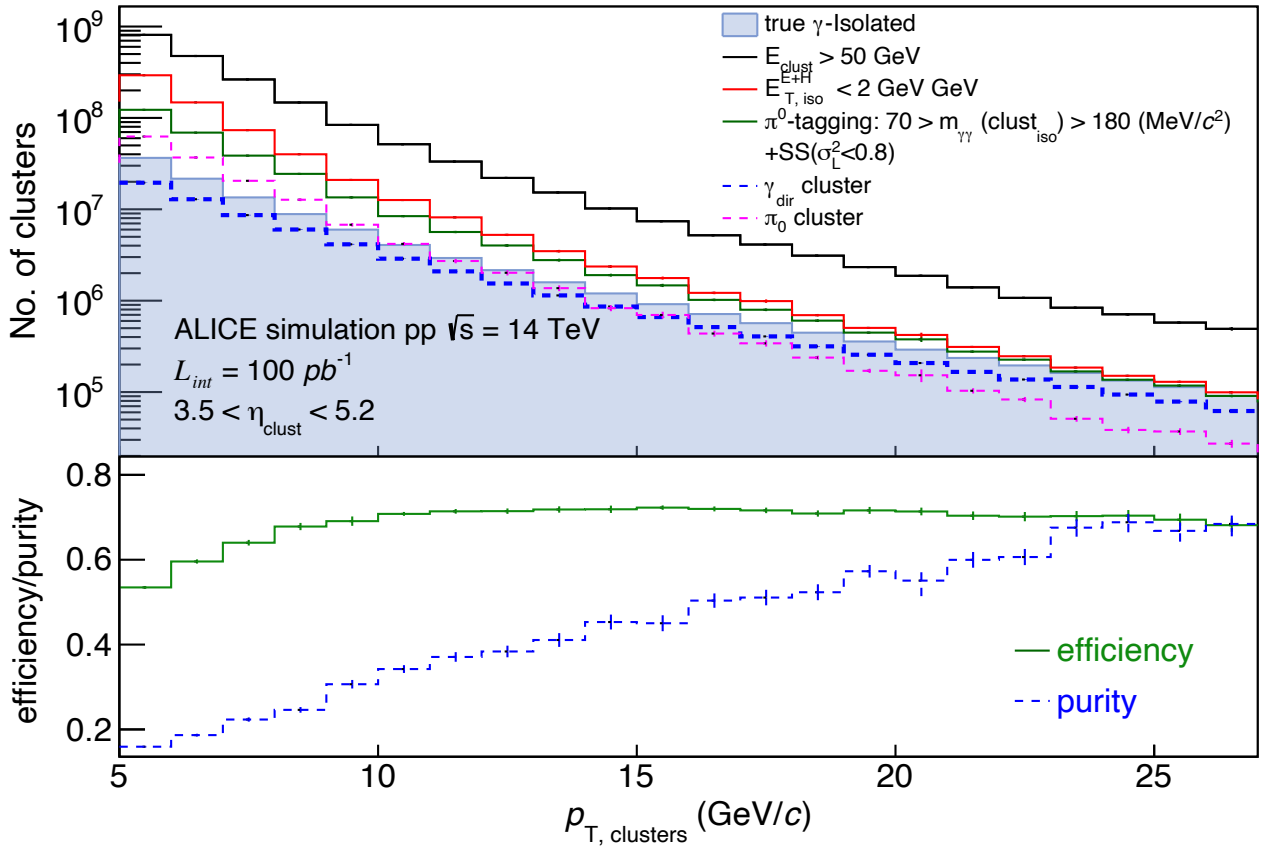
typical shower shape, dN/rdr



The parameters obtained from $f(x)$ are used in the clustering

(See2.2-Fig.2 NISER)

Photon-hadron correlations (NISER)



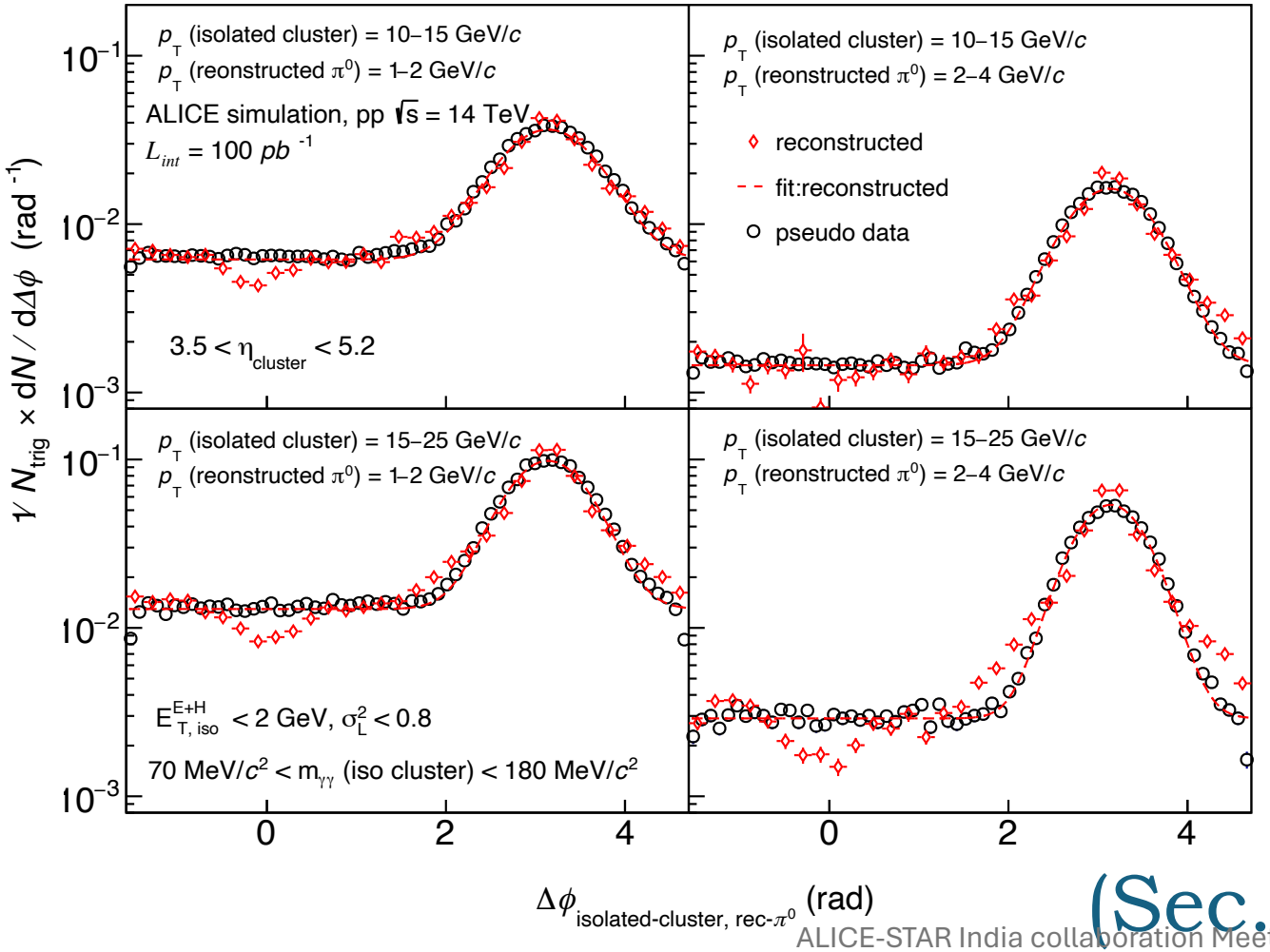
- purity has values in the range 30-60% for p_T >10 GeV/c
- Correlation measurements for p_T < 10 GeV/c require further optimization, in order to achieve the required purity while maintaining sufficient efficiency

- The physics of forward direct photon-hadron (γ_{dir}–h) correlations as a probe of non-linear QCD evolution
- Saturation effects are expected to modify the shape of the azimuthal distribution of γ_{dir}–h correlations, and a key performance metric for the FoCal in this channel is the precision with which the width of such correlation functions can be measured in practice.
- This work provides a first estimate of that precision.

(Sec.8-Fig.51 NISER)

Isolated cluster–π^0 correlation (NISER)

Azimuthal distribution of isolated cluster–π^0 correlation functions in the FoCal acceptance in pp collisions at $\sqrt{s}$ = 14 TeV.



Statistical precision of this measurement for the projected Run 4 integrated luminosity, Lint = 100 pb $^{-1}$.

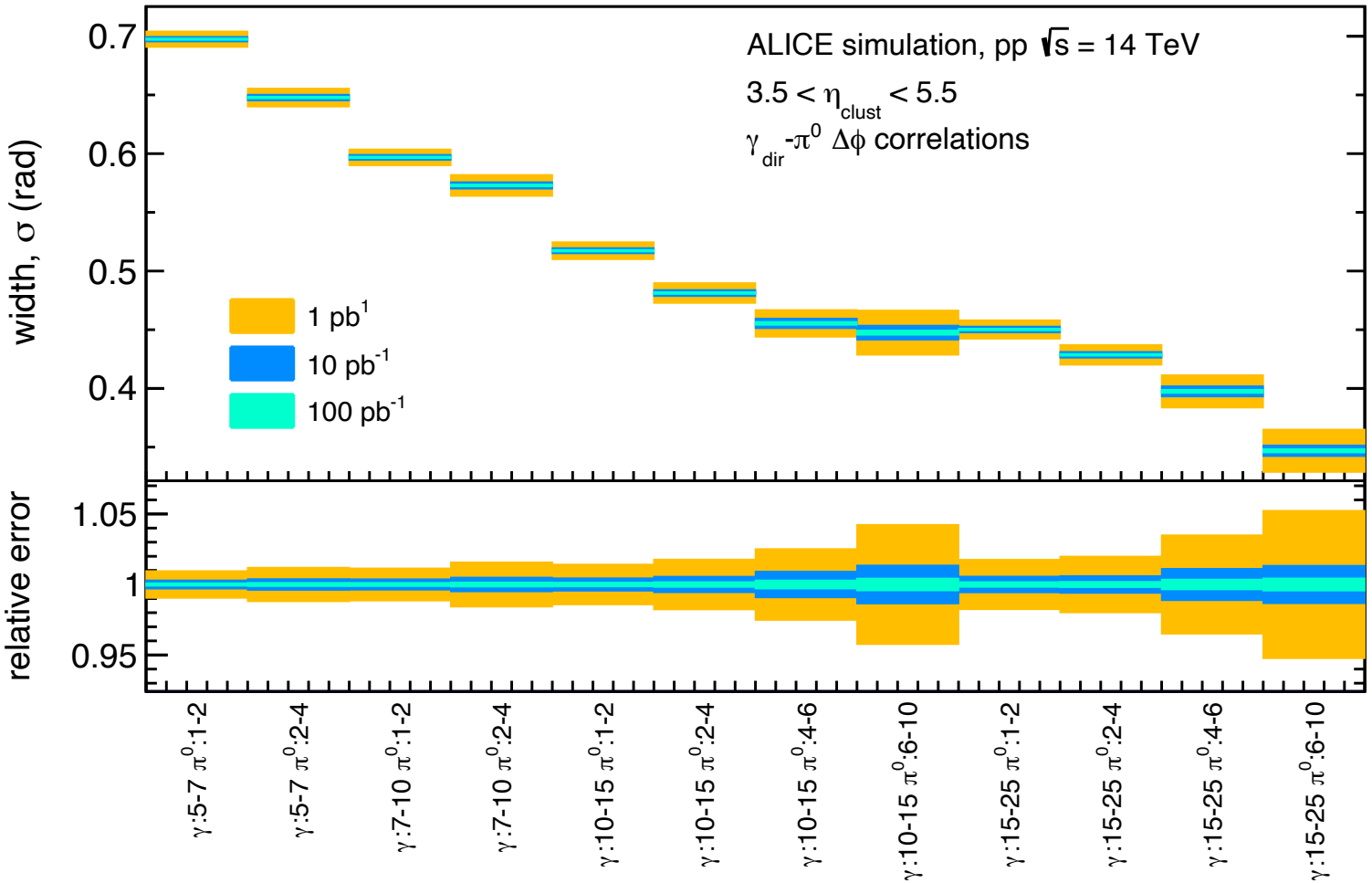
$$f(\Delta\varphi) = c + \frac{1}{\sigma\sqrt{2\pi}} e^{-(\Delta\varphi-\mu)^2/2\sigma^2}$$

The fit function on measured distributions used to get pseudo-data for Lint = 100 pb $^{-1}$.

The width and error are calculated from the pseudo-data.

(Sec.8-Fig.52 NISER)

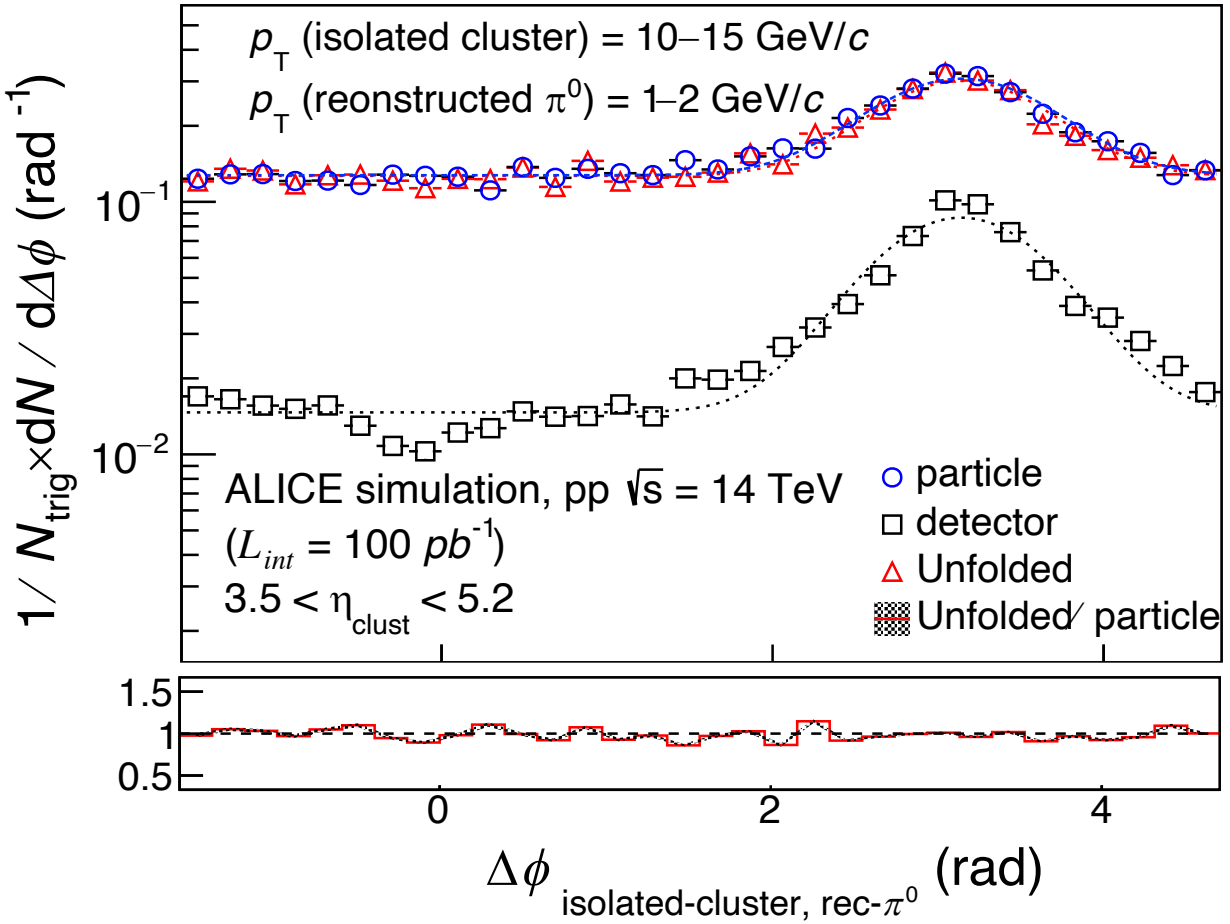
Estimation of the precision of width measurement (NISER)



The bands in lower panel, provide estimates of the sensitivity of this measurement to modifications in the γ_{dir}–π^0 azimuthal distribution due to saturation effects for 100 pb^{-1} ,10 pb^{-1} , and 1 pb^{-1}

(Sec.8-Fig.53 NISER)

Extraction of direct photon-π^0 correlations (NISER)



A purity-weighted background template was subtracted from the raw correlation function in ALICE γ_{dir}–hadron correlations in central barrel.

Alternative approach, which transforms the experimentally measurable γiso–π0 candidate correlation to obtain the γ_{dir}–π^0 correlation using iterative Bayesian unfolding.

(Sec.8-Fig.54 NISER)

Measurement of π^0, η, and ω in pp collisions (IIT Indore, Shankar Nair)

1. Fit using a polynomial function
2. Event mixing method, where underlying correlations are removed by considering only pairs of clusters formed from different collision events
3. Rotational background method, where underlying correlations are removed by considering only clusters pairs from the same event with one of the cluster positions rotated with by a random azimuthal angle

(IIT Indore, Shankar Nair)

π^0

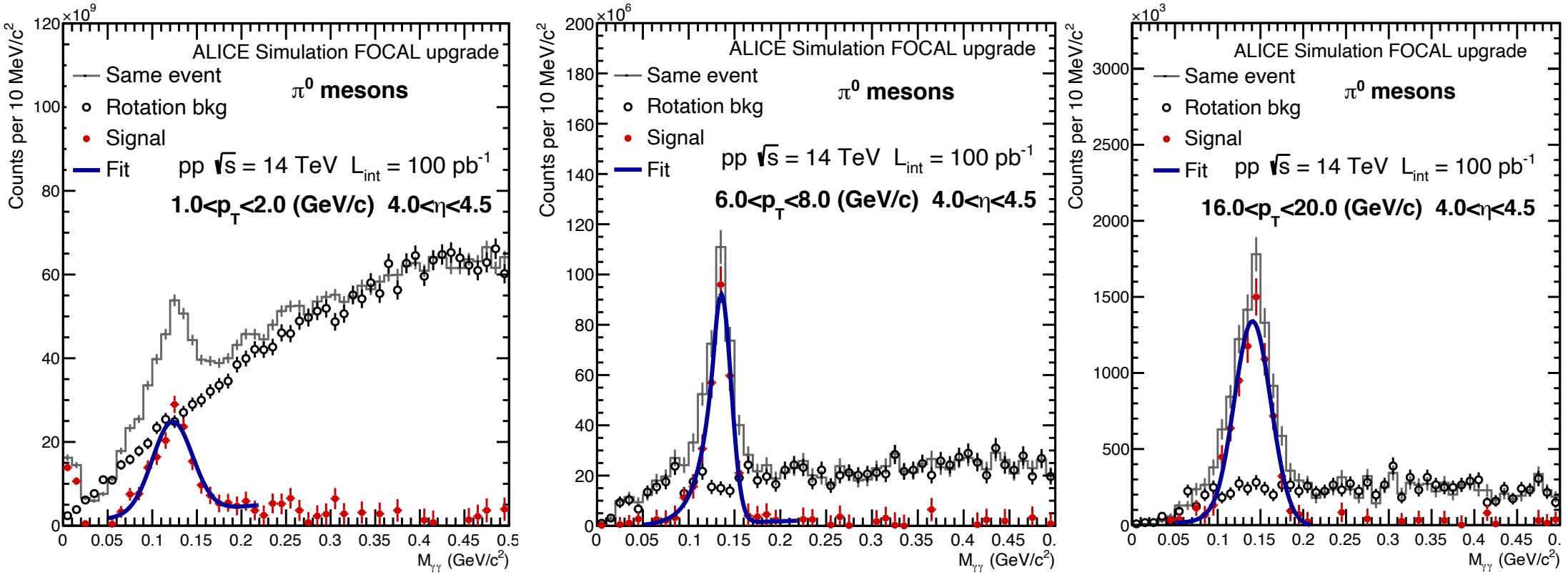


Fig. 29: Di-photon invariant mass distribution in pp collisions at $\sqrt{s} = 14$ TeV generated by PYTHIA, with events with at least one high-p_T π^0 within the FoCal acceptance. The background distribution is determined by random rotation of the clusters from the same event. The yield corresponds to integrated luminosity of 100 pb^{-1}. Vertical axis scale gives counts per bin corresponding to $\mathscr{L}_{\rm int} = 100$ pb^{-1}, while the jitter of the points is due to the statistical precision of the simulated dataset.

(Sec2.2-Fig.29 IIT Indore)

Π^0 peak position and peak width

(IIT Indore, Shankar Nair)

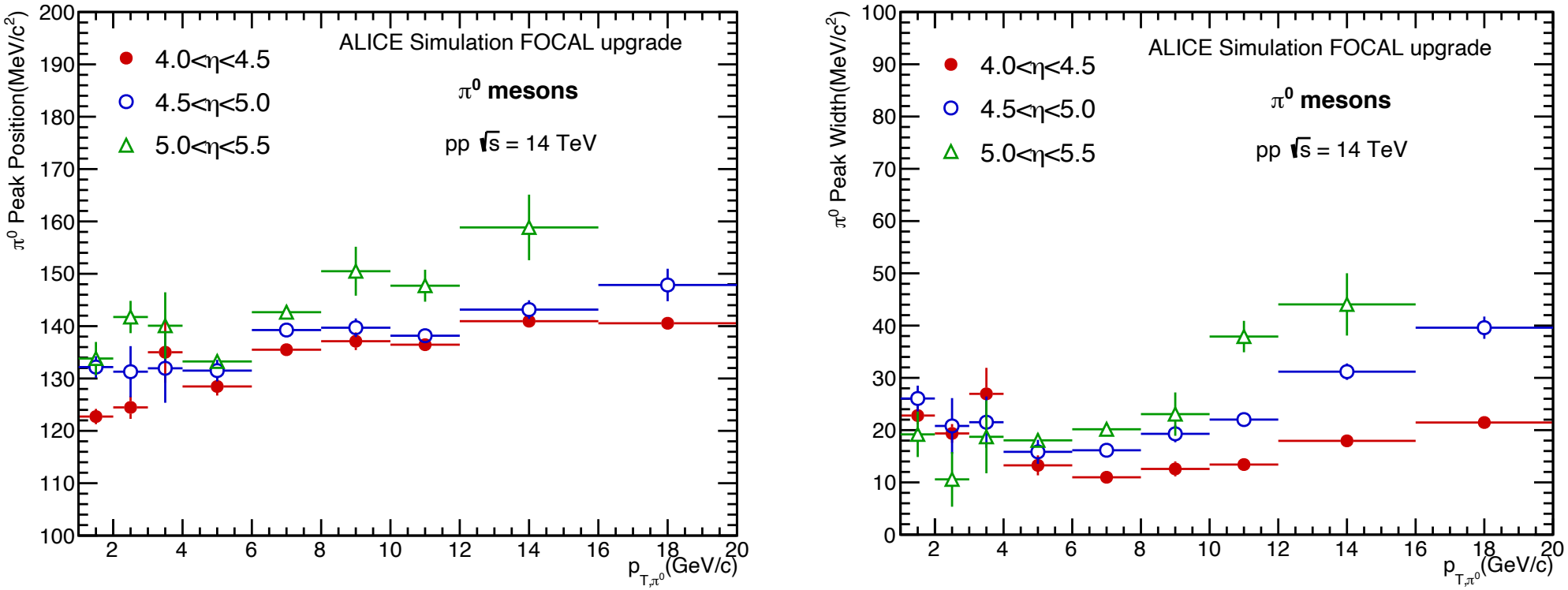


Fig. 30: Transverse momentum dependence of the reconstructed π^0 signal mass pole and width. Error bars are due to the statistical precision of the simulated dataset.

The background-subtracted invariant mass distribution is fitted using the Crystal Ball function. Figure 30. shows the mass and Gaussian core width extracted from the fit, as a function of p_T

(Sec2.2-Fig.30 IIT Indore)

η-mesons

(IIT Indore, Shankar Nair)

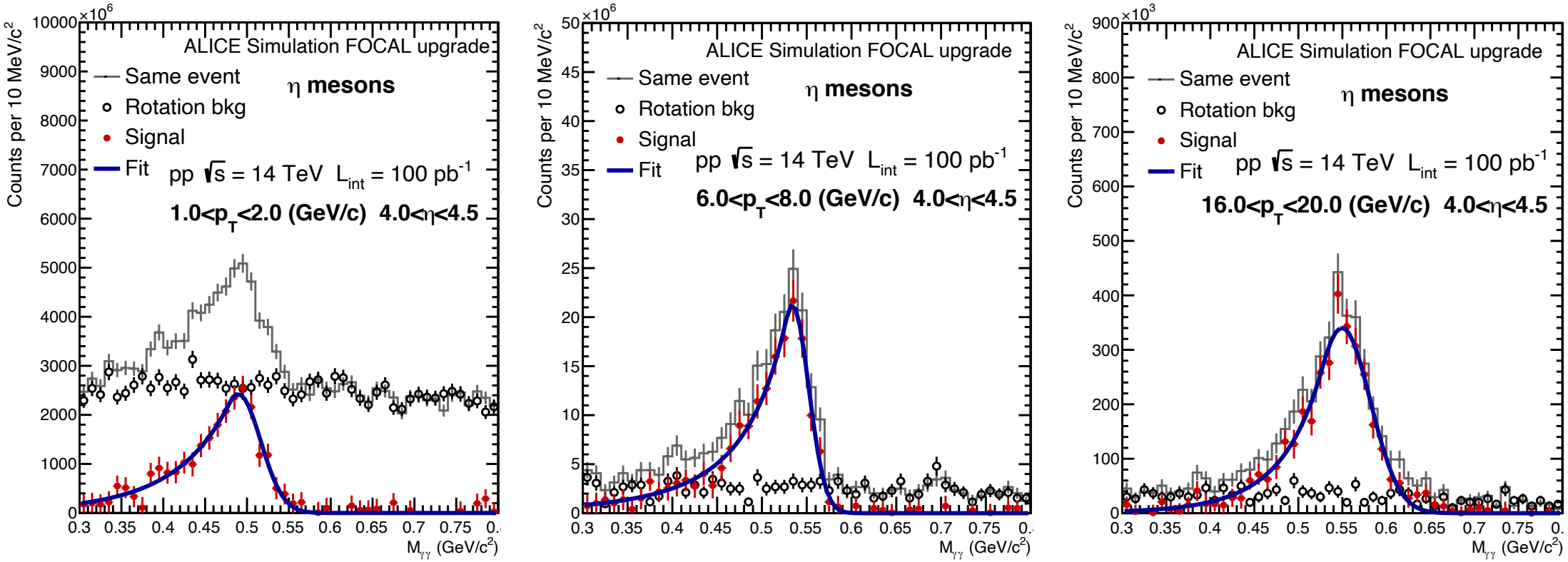


Fig. 31: Same as Fig. 29, for η-mesons. Vertical axis scale gives counts per bin corresponding to $\mathscr{L}_{\rm int} = 100\ {\rm pb}^{-1}$, while the jitter of the points is due to the statistical precision of the simulated dataset.

(Sec2.2-Fig.31 IIT Indore)

η-mesons

(IIT Indore, Shankar Nair)

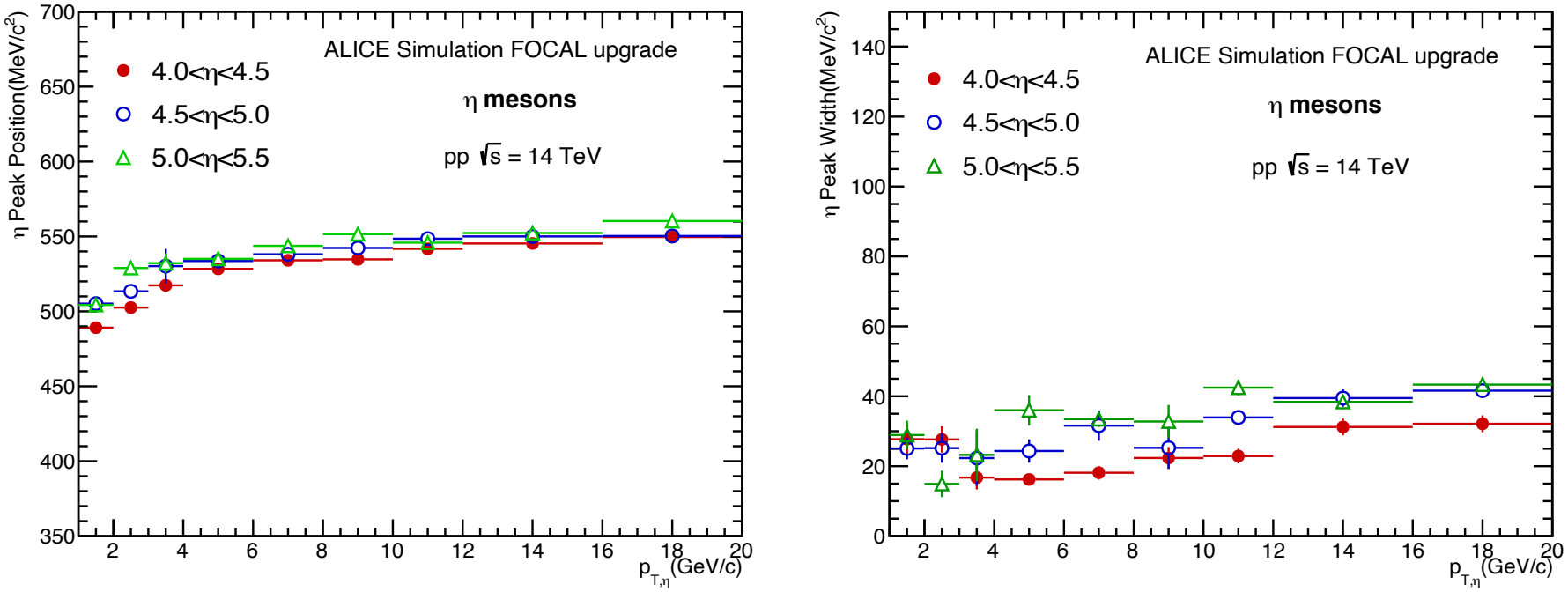


Fig. 32: Transverse momentum dependence of the reconstructed η signal mass pole and width.

The background-subtracted invariant mass distribution is fitted using the Crystal Ball function. Figure 32. shows the mass and Gaussian core width extracted from the fit, as a function of p_T

(Sec2.2-Fig.32 IIT Indore)

ω-mesons

(IIT Indore, Shankar Nair)

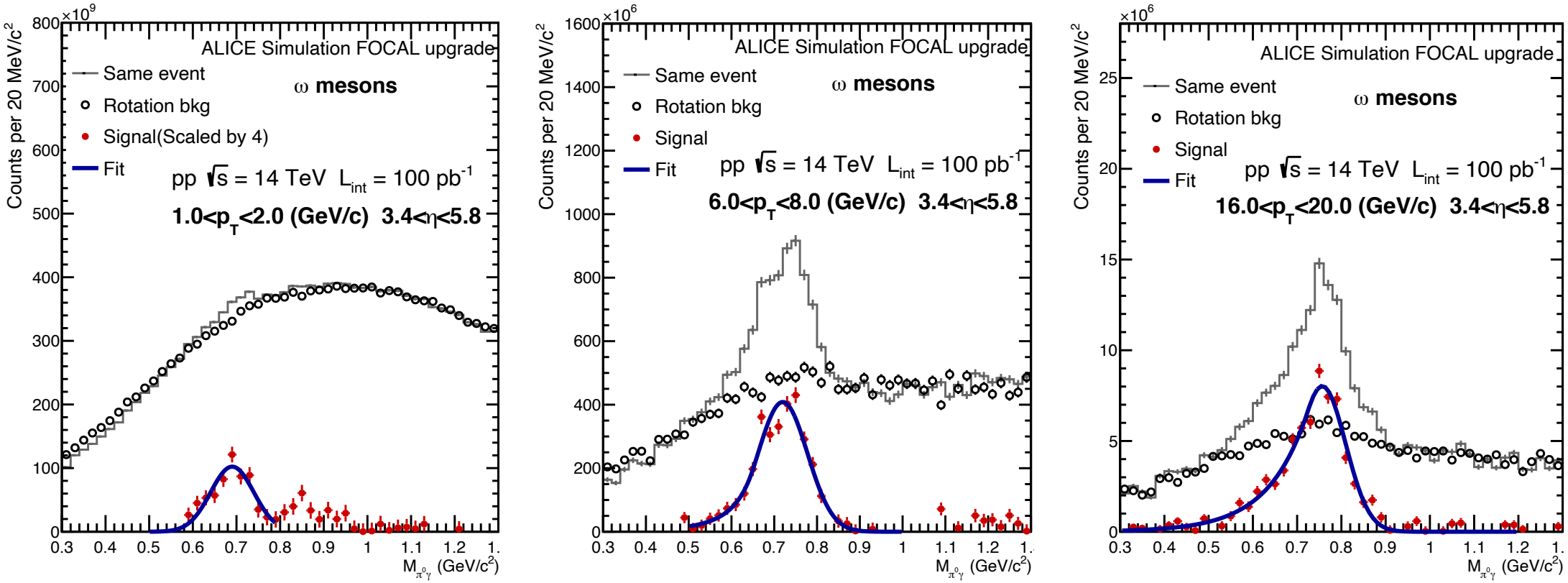


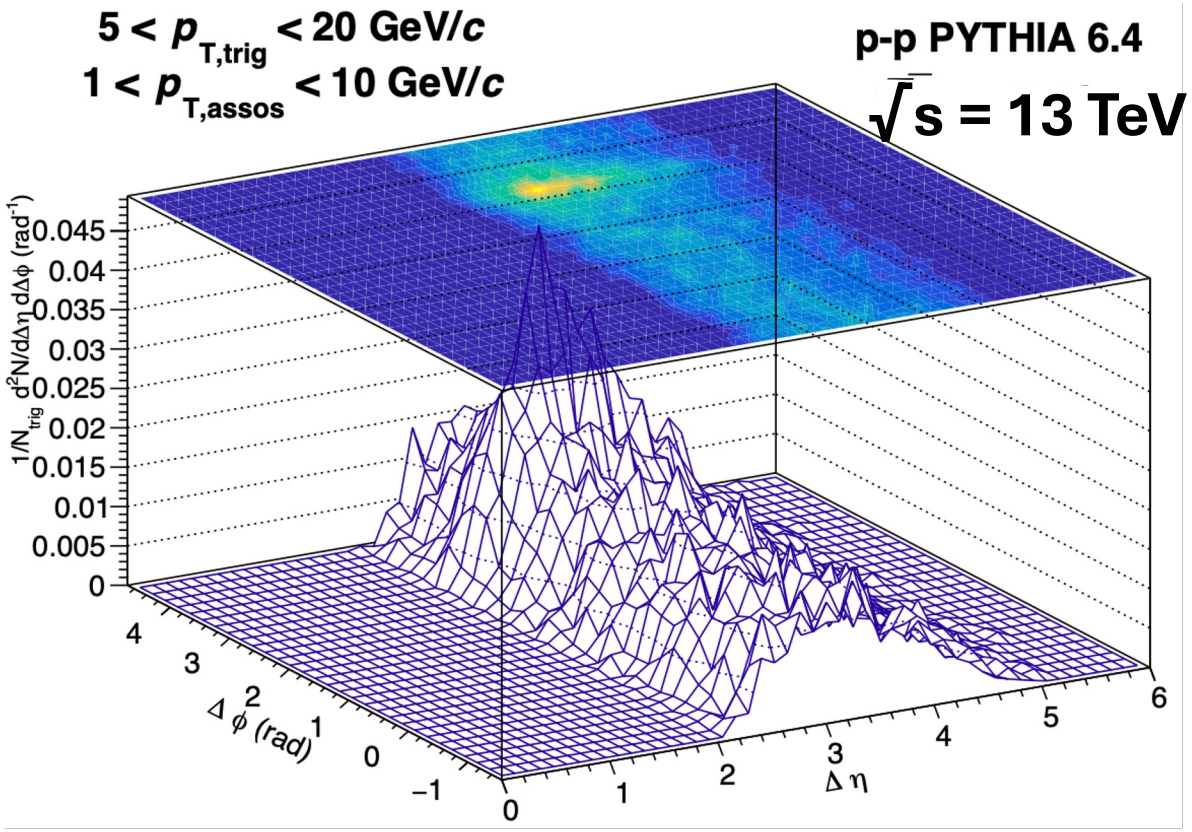
Fig. 33: Same as Fig. 29, for ω-mesons.

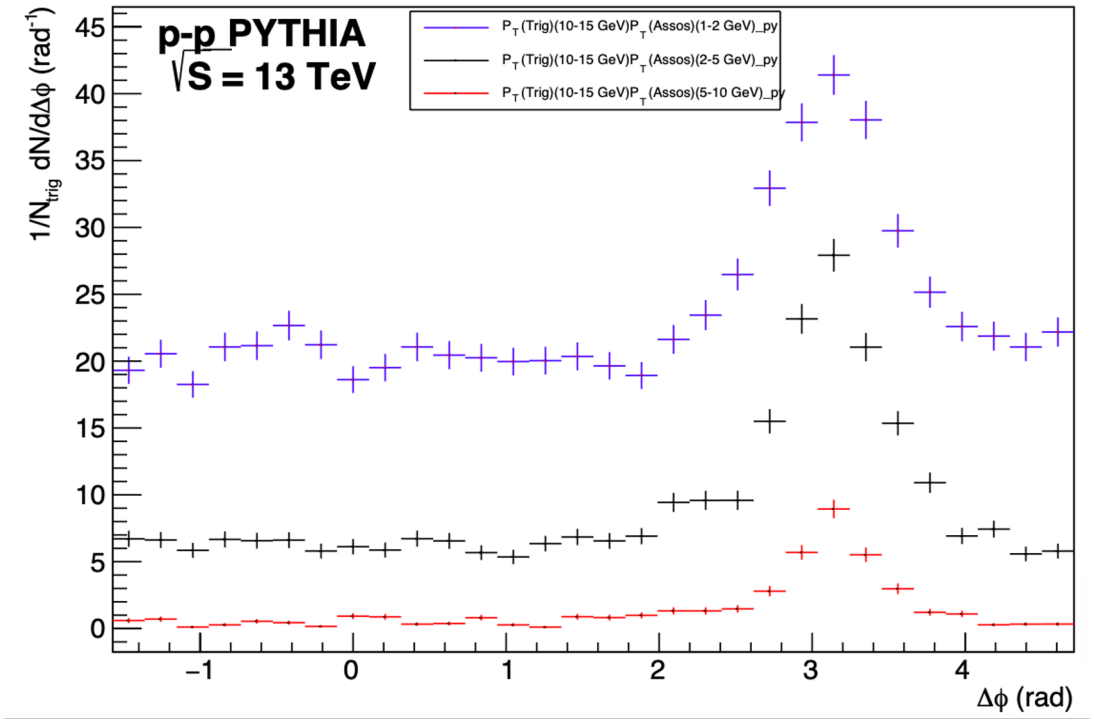
(Sec2.2-Fig.33 IIT Indore)

Incomplete topics status

π^0-hadron correlation (FOCAL-Barrel) in pp collision

Akash Pandey (IIT Bombay)





- p-p PYTHIA "triggered decay photon" data (p_{Tmin} ~ 5 GeV/c, 10 GeV/c, 15 GeV/c)
- Reconstructed π^0 from FOCal and charged particles from Pythia (|η| <1)

Jet Reconstruction Performance in FoCal

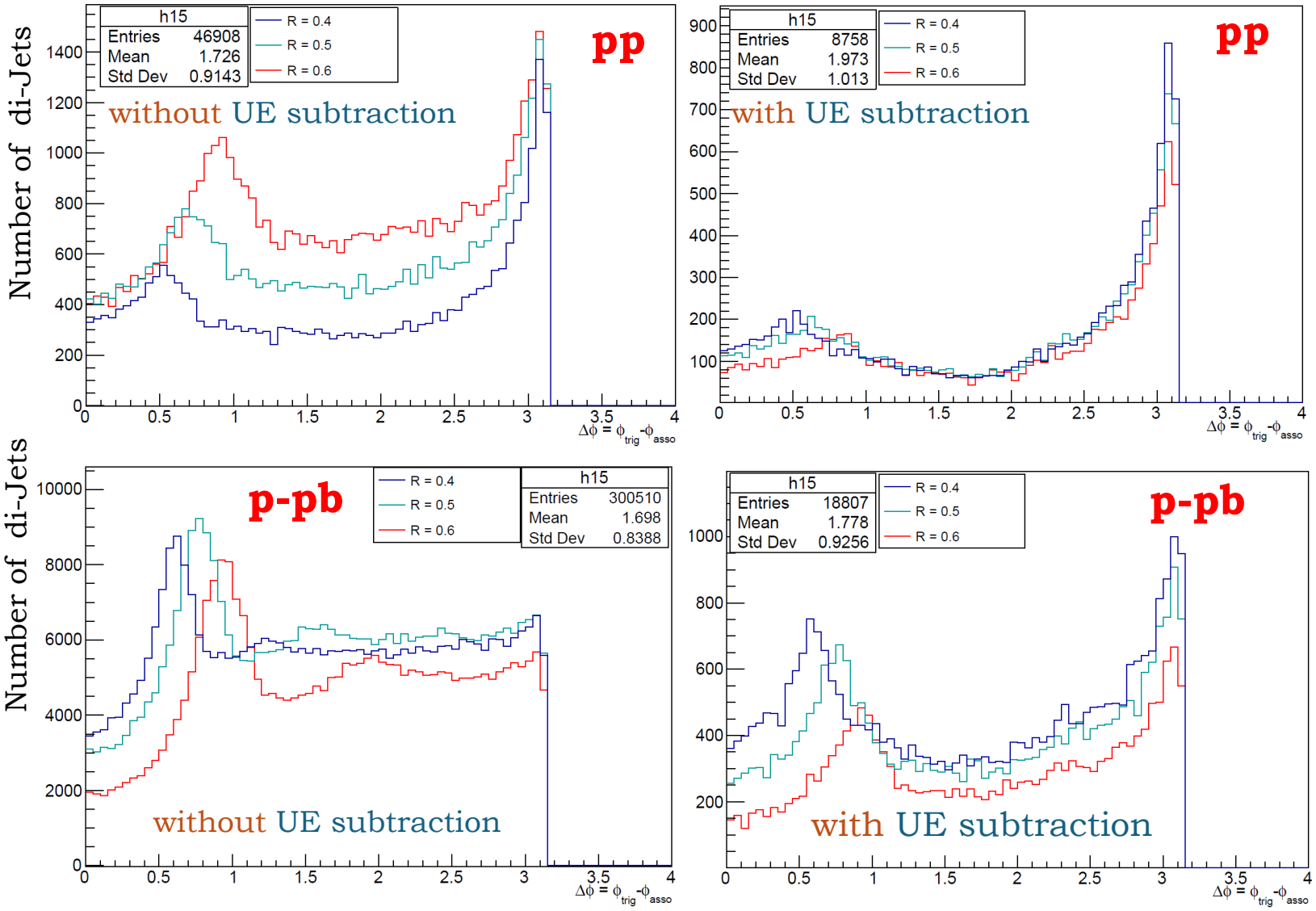
Kshitish Kumar Pradhan
Indian Institute of Technology Indore

- p+p (**pythia triggered decay photon pt>5 GeV/c)**
- Number of events: ~50 K
- Focal acceptance 3.2 < eta < 5.8
- Minimum jet pT (pTmin) = 5.0 GeV. (Jet include clusters and hadronic tower information)
- Jet Radius R = 0.2,0.4,0.5,0.6,0.8
- Jet **matched_distance < 0.25**
- Anti-kt algorithm
- **p+Pb (Hijing + decay photon p >4 GeV/c)**

Underlying Event (UE) subtraction

- The method of perpendicular cone is used to measure and subtract UE contribution
- Event-by-event calculation is done for UE based on circular region perpendicular to the leading p_T jet (in same η)

Δϕ distribution (If jet no >= 2)

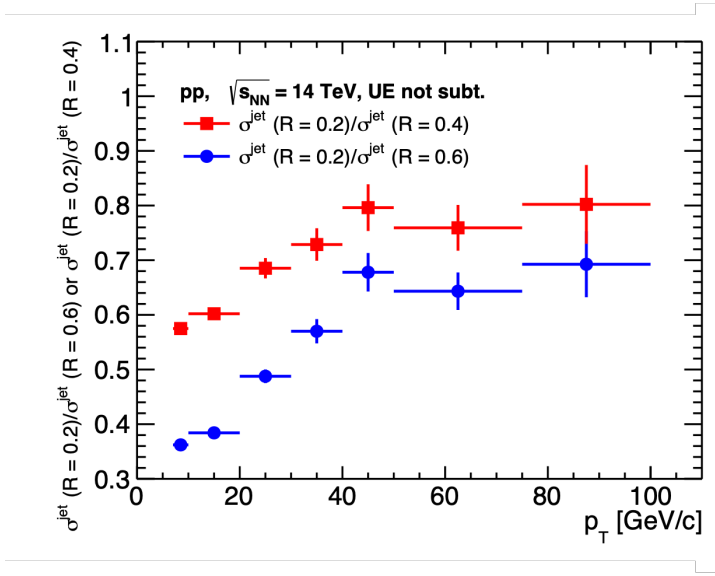


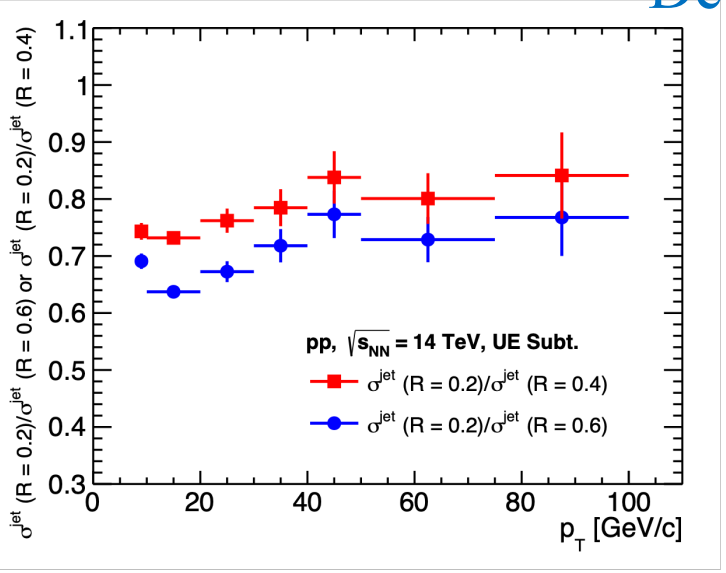
Kshitish will present his work today ..

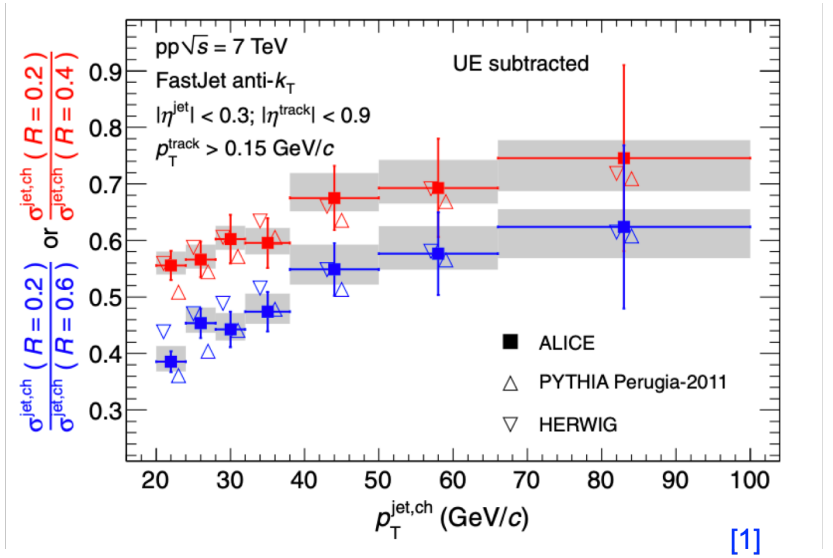
- ✓ The R dependencies almost vanishes after UE subtraction in both pp and p-pb system
- ✓ Studying performance in detail at this forward rapidity

Scattering cross section ratio

Debadatta Behera, IIT Indore







[1]

- The differential jet cross section is evaluated using the following relation:

$$\frac{d^2\sigma^{jet,ch}}{dp_T d\eta}(p_T^{jet,ch}) = \frac{1}{\mathscr{L}^{int}} \frac{\Delta N_{jets}}{\Delta p_T \Delta \eta}(p_T^{jet,ch}),$$ where $\mathscr{L}^{int}$ is the integrated luminosity

- Ratio increases from low p_T to high p_T and **saturates** at high p_T
- It indicates jet collimation is **higher** at larger p_T than low p_T

[1] B. Abelev et al. [ALICE Collaboration], PHYSICAL REVIEW D 91, 112012 (2015)

π^0 reconstruction in Pb-Pb collisions

Sandeep Dudi (Panjab University, Chandigarh)

Data set: Pb-Pb 5.5 TeV, HIJING and box π0
Link of data: /alice/cern.ch/user/f/focal/sim/v1.10/hijingPbPb/
Box π0 : /Alice/cern.ch/user/f/focal/sim/v1.10/box/pi0MomUniform

- Embedded Pb-Pb Peripheral events with box π^0 simulation : 78200 events
- Embedded Pb-Pb mid-central events with box π^0 simulation : 71600 events

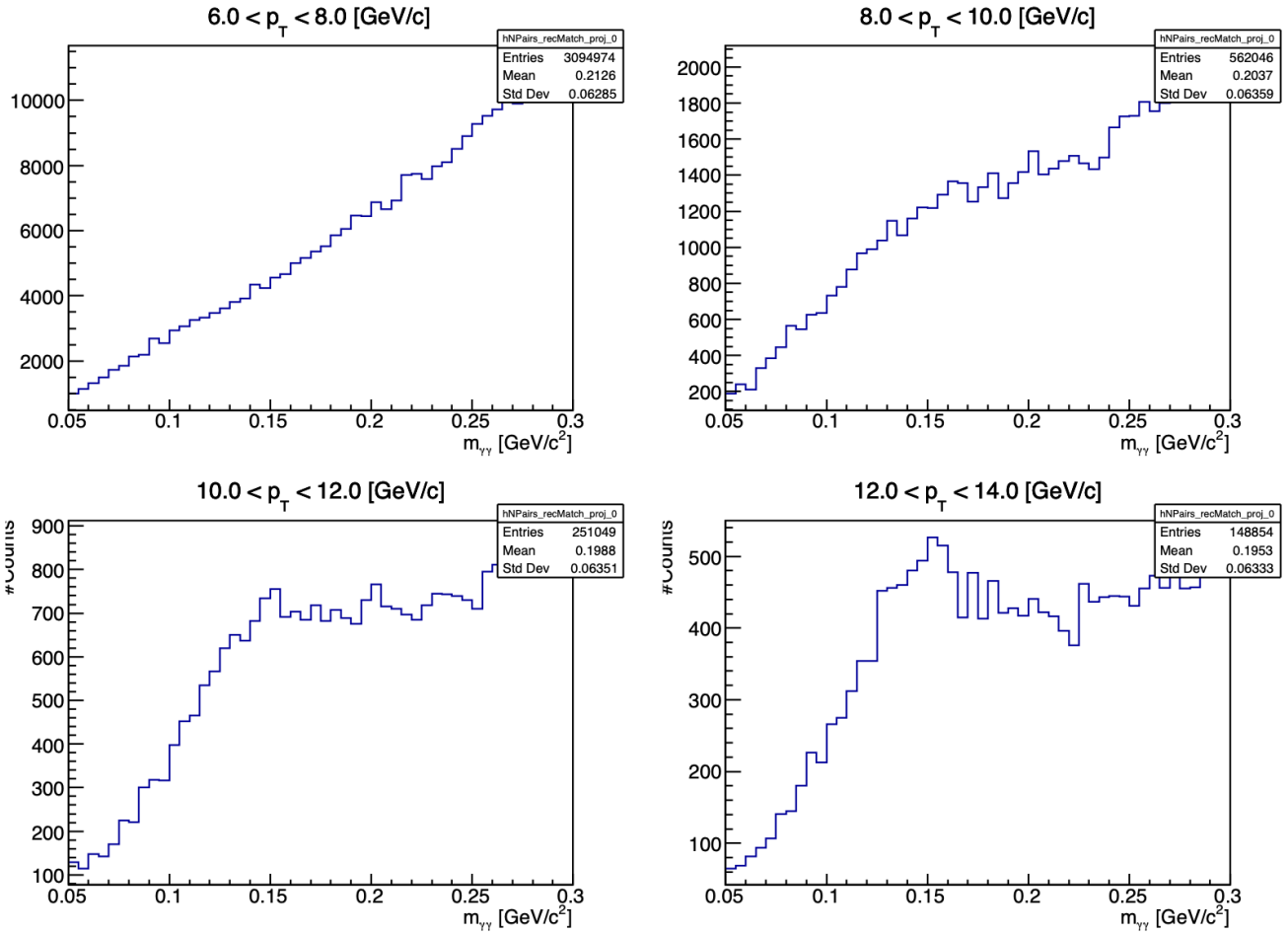
- The invariance mass technique is used to get the π^0 signal peak $M_{inv} = \sqrt{2E_1E_2 - 2p_1.p_2}$, Where E_1, E_2 are energies and p_1, p_2 are momentum vector

- η cut $3.5 < \eta < 5.5$

Criteria for matching
- Matched Dist < 0.4
- dPhi < 0.4
- Alpha < 0.7 => E1- E2/(E1+E2)

Decay channel used :
$\pi^0 \rightarrow \gamma + \gamma$

π^0 invariant mass distribution



Pb-Pb **mid-central collisions**
No matching

η cut

$3.5 < \eta < 5.5$

The peak barely appear at 10-12 GeV/c

Efficiency will be checked for different rapidity window and centrality classes

Improvement to be made in future

- *Little effort put in last couple of months before finalizing the contributions for the public note on physics performance*
- *Some analysis like PbPb and UPC had issues of background generation in embedding processes.*

- We expect the institutes should complete the pending analysis tasks
- Since we are in moving in o2 framework, developing the analyses in the new framework would be highly appreciated
- Call for contribution in the o2-developmental tasks from students with good knowledge in C++ and o2 would be considered.

FoCal simulation effort ALICE India – Future directions

(+discussion)

Analysis topics institute wise and progress

Institutes	Topic	Contributors	Progress
IIT Indore	(i) Jet reconstruction (pp, p-Pb) single and di-jet reconstruction performance (ii) Ω recontruction in pp, pPb, PbPb	Debedatta Behera and Kshitish Pradhan (PhD students) Shankar Nair (2nd yr. student)	i) Significant progress [not sufficient effort to complete] ii) Completed for pp - π^0, η, Ω performance in pp
IIT Bombay	(i) Misalignment studies in technical simulations (ii) Two-particle correlations (p-Pb): FOCAL-barrel: π^0– hadron	Akash Pandey (Postdoctoral Fellow)	i) Did not start the simulation topic ii) Significant progress [not sufficient effort to complete]
Gauhati University	Started Installing software	Pallabi Saha (Project Associate)	Did not start any simulation topic
Jadavpur University	Two-particle correlations (pp): FOCAL-barrel: π^0– hadron	Somnath Kar (Postdoctoral Fellow)	Did not start any simulation topic
Jammu University	Started Installing software	Balwan Rana (PhD students)	Did not start any simulation topic
Panjab University	Performance for π^0, η, Ω in Pb-Pb	Sandeep Dudi and Anjali Sharma (PhD students)	Significant progress (technical issues on in embedding smaples)
NISER	(i) Two-particle correlations (pp), FOCAL-FOCAL γ-π^0 (ii) Photo-production in ultra-peripheral collisions (Pb-Pb) - dijets	Mriganka M. Mondal (Research Physicist) Ranbir Singh (Staff Scientist)	i) Completed ii) (Technical issues on event generators)

Current expression of interests

1. IIT Mumbai : Sayan, Rahul, Swadhin, Balaram
Early years in Ph.D. They are interested to know about ongoing activities in FoCal
2. IIT Indore : Ayan
Installed FoCal software and he is trying to reproduce some results from physics performance note.
3. Cooch Behar Panchanan Barma University : Prabir Haldar, Dibakar Dhar, Tumpa Biswas
Interested to get involved in FoCal software
4. Jadavpur University : Mitali Mondal, Subikash, Hirak
Wanted to get involved with some FoCal o2 developing tasks. We need to find if some of them can be included as service tasks.
5. Panjab University : Harmanjot
Needs to discuss with his supervisor regarding plans.
6. Jammu University: Renu Bala, Ramni Gupta
7. Bose Institute: Sidharth Kumar Prasad
8. VECC: Arun
9. NISER: Mriganka Mouli Mondal, Ranbir Singh, Anantha
Anantha is doing a one year Master project. He is running simulation chains and plans to develop single photon reconstruction in O2 frames.
Other interests: UPC di-jets, photon-jets/pi0's, direct photon identification techniques.

Interest on analysis topics institute wise (Past+present …)

Institutes	Topic	Contributors (Interests)	Progress Last Year
IIT Indore	(i) Jet reconstruction (pp, p-Pb) single and di-jet reconstruction performance (ii) Ω recontruction in pp, pPb, PbPb	Debedatta Behera and Kshitish Pradhan (PhD students) Ayan	i) Debedatta Behera and Kshitish Pradhan made significant progress [not sufficient effort to complete] ii) Shankar completed for pp - π^0, η, Ω performance in pp; Ayan continuing…
IIT Bombay	(i) Two-particle correlations (p-Pb): FOCAL-barrel: π^0– hadron (FOCAL-central) (ii) di-jets?	Sayan, Rahul, Swadhin, Balaram	(ii) Akash made a significant progress pp [not sufficient effort to complete] new students continuing…..
Jadavpur University	Topic to be decided	Subikash, Hirak	
Panjab University	Performance for π^0, η, Ω in Pb-Pb	Harmanjot	Sandeep Dudi made Significant progress (technical issues on embedding). Anjali+Harmanjot
NISER	(i) Two-particle correlations (pp), FOCAL-FOCAL γ-π^0 (ii) Photo-production in ultra-peripheral collisions (Pb-Pb) – di-jets. (iii) direct photon identification techniques, clustering characterization	Mriganka M. Mondal Ranbir Singh Anantha	i) Mriganka & Ranbir framing in o2 ii) Continuing …. iii) Anantha Continuing …

New people/new topic are in underline

Interest on analysis topics institute wise (Past+present …)

Institutes	Topic	Contributors	Progress from Last year
Cooch Behar Panchanan Barma University	Topic to be decided	Dibakar Dhar, Tumpa Biswas	
Bose Institute	Topic to be decided	Sidharth Kumar Prasad	
Jammu University	Topic to be decided	Ramni Gupta, Reni Bala	
VECC	Topic to be decided	Arun	

- I would send email to the ALICE India collaboration to get written confirmation about simulation topics each institute want to complete, people who would be working, and how much time they will spend.

- Any overlapping topics would be avoided with mutual discussions.

FOCAL-O2 Priority works

FOCAL-62 : Development of the ECAL geometry	4 sub tasks 3 assigned, 1 not assigned	➢ Geometry helper class for FOCAL-E ➢ Error handling geometry for FOCAL-E ➢ Unit test Geometry for FOCAL-E ➢ Virtual Geometry for the virtual MC for FOCAL-E	
FOCAL-65 : Development of the HCAL geometry	All assigned	➢ Geometry helper class for FOCAL-E ➢ Error handling geometry for FOCAL-E ➢ Unit test Geometry for FOCAL-E ➢ Virtual Geometry for the virtual MC for FOCAL-E	
FOCAL-77 : Development of the hit class for all FOCAL systems	Assigned		
FOCAL-88 : Development of a MC Label class for all FOCAL subdetectors	Assigned		
FOCAL-94 : Development of a parameter class for Simulation parameters	Unassigned		

FOCAL O2 development tasks

https://its.cern.ch/jira/secure/Dashboard.jspa?selectPageId=26103

Filter Results: FOCAL o2 Epics

T	Key	Summary ↓	
⚡	FOCAL-93	Physics performance studies and validation	Assigned
⚡	FOCAL-89	O2 developments for various testbeams	Assigned
⚡	FOCAL-55	Developments of the geometry and detector simulation within O2	Unassigned
⚡	FOCAL-60	Development of various calibration workflows for FOCAL within O2	Unassigned
⚡	FOCAL-61	Development of the QualityControl for FOCAL within AliceO2	Unassigned
⚡	FOCAL-56	Development of the FOCAL digitizers within o2	Unassigned
⚡	FOCAL-57	Development of the FOCAL clusterizers within O2	Unassigned
⚡	FOCAL-58	Development of a reconstruction workflow within O2	Unassigned
⚡	FOCAL-59	Development of FOCAL-related CCDB objects within O2	Unassigned

1–9 of 9

ALICE-FOCAL / FOCAL-89

O2 developments for various testbeams

Edit | Add comment | Assign | More | Open | Export

Details

Type:	Epic	Resolution:	Unresolved
Priority:	Minor	Fix Version/s:	None
Affects Version/s:	None		
Component/s:	O2, Testbeam		
Labels:	FOCAL o2 testbeam		
Epic Name:	O2 testbeam		
Change scope:	Manifest change		
Checklist:	EMPTY		
Complexity:	144		

Description

Tickets related to O2 developments for the various testbeams

Attachments

Drop files to attach, or browse.

Issues in epic

FOCAL-8	Development of a QC task for raw data from the Nov. testbeam	IN PROGRESS	Markus Fasel
FOCAL-10	Reconstruction workflow for FOCAL-E for testbeam data	IN PROGRESS	Markus Fasel
FOCAL-20	LTU configuration for FOCAL Testbeam	IN PROGRESS	Tommaso Isidori

Activity

All | Comments | Work Log | History | Activity | Transitions | Time In Status | Links Hierarchy

There are no comments yet on this issue.

People

Assignee: Tommaso Isidori
Assign to me

Reporter: Markus Fasel

Votes: 0 Vote for this issue

Watchers: 1 Start watching this issue

Dates

Created: 11/Apr/24 10:50 PM

Updated: 18/Apr/24 10:04 PM

Summary Panel

Time: 0h / 0h

Completed Issues: 0 / 4

Story Points: 0 / 0

Attachments: 0

Development

Create branch

Agile

Find on a board

ALICE-FOCAL / FOCAL-56

Development of the FOCAL digitizers within o2

Edit | Add comment | Assign | More | Open | Export

Details

Type:	Epic	Resolution:	Unresolved
Priority:	Major	Fix Version/s:	None
Affects Version/s:	None		
Component/s:	O2		
Labels:	FOCAL Simulation epics o2		
Epic Name:	O2 digitizers		
Change scope:	Manifest change		
Checklist:	EMPTY		
Complexity:	144		

Description

Tickets connected to the digitizer implementation of the FOCAL subdetectors within AliceO2

Attachments

Drop files to attach, or browse.

Issues in epic

FOCAL-70	Development of the digitizer of FOCAL Pads within O2	OPEN	Unassigned
FOCAL-71	Development of the digitizer of FOCAL Pixels within O2	OPEN	Unassigned
FOCAL-72	Development of the digitizer of FOCAL HCAL within O2	OPEN	Hadi Hassan
FOCAL-73	Development of the raw encoder for FOCAL Pads	OPEN	Unassigned
FOCAL-74	Development of the raw encoder for FOCAL Pixels	OPEN	Unassigned
FOCAL-75	Development of the raw encoder for FOCAL HCAL	OPEN	Unassigned
FOCAL-76	Tests of the FOCAL digitizers	OPEN	Unassigned

People

Assignee: Unassigned
Assign to me

Reporter: Markus Fasel

Votes: 0 Vote for this issue

Watchers: 1 Start watching this issue

Dates

Created: 09/Apr/24 6:15 PM

Updated: 10/Apr/24 5:23 PM

Summary Panel

Time: 0h / 0h

Completed Issues: 0 / 8

Story Points: 0 / 0

Attachments: 0

Development

Create branch

Agile

Find on a board

Other tasks ..

Filter Results: FOCAL o2 critical

T	Key	Summary	P
	FOCAL-87	FOCAL-65 / Virtual Geometry for Virtual MC for FOCAL-H	
	FOCAL-81	FOCAL-62 / Virtual Geometry for the virtual MC for FOCAL-E	
	FOCAL-66	Development of the detector simulation for pads	
	FOCAL-55	Developments of the geometry and detector simulation within O2	

1–4 of 4

Filter Results: FOCAL o2 blockers

T	Key	Summary	P
	FOCAL-84	FOCAL-65 / Geometry helper for FOCAL-H	
	FOCAL-78	FOCAL-62 / Geometry helper class for FOCAL-E	
	FOCAL-65	Development of the HCAL geometry	
	FOCAL-62	Development of the ECAL geometry	

1–4 of 4

FoCal simulations in O2: email conversation with Ionut & Markus

June : 24

Good to hear from you. Indeed we are aware that the Indian Institutes want to contribute to the O2 implementation of FOCAL. We discussed so far with Arun, who is a student from VECC. We had a couple of meetings where we discussed some of these tasks, but **at the moment its not easy to assign all of the tasks because we have a rather sequential way of implementing the package. So we are now at the hit simulation stage and then the digitization with realistic detector response implementation will start. Later on we expect to have more tasks which will deal with checks of the various implementations, performance tests on simulations and so on.**

June : 25

Since you are at the ALICE India meeting you have the chance to maybe talk with your colleagues so you can have an overview of the foreseen manpower that ca be dedicated to core software developments for FOCAL O2 and to performance tests on O2 simulations.

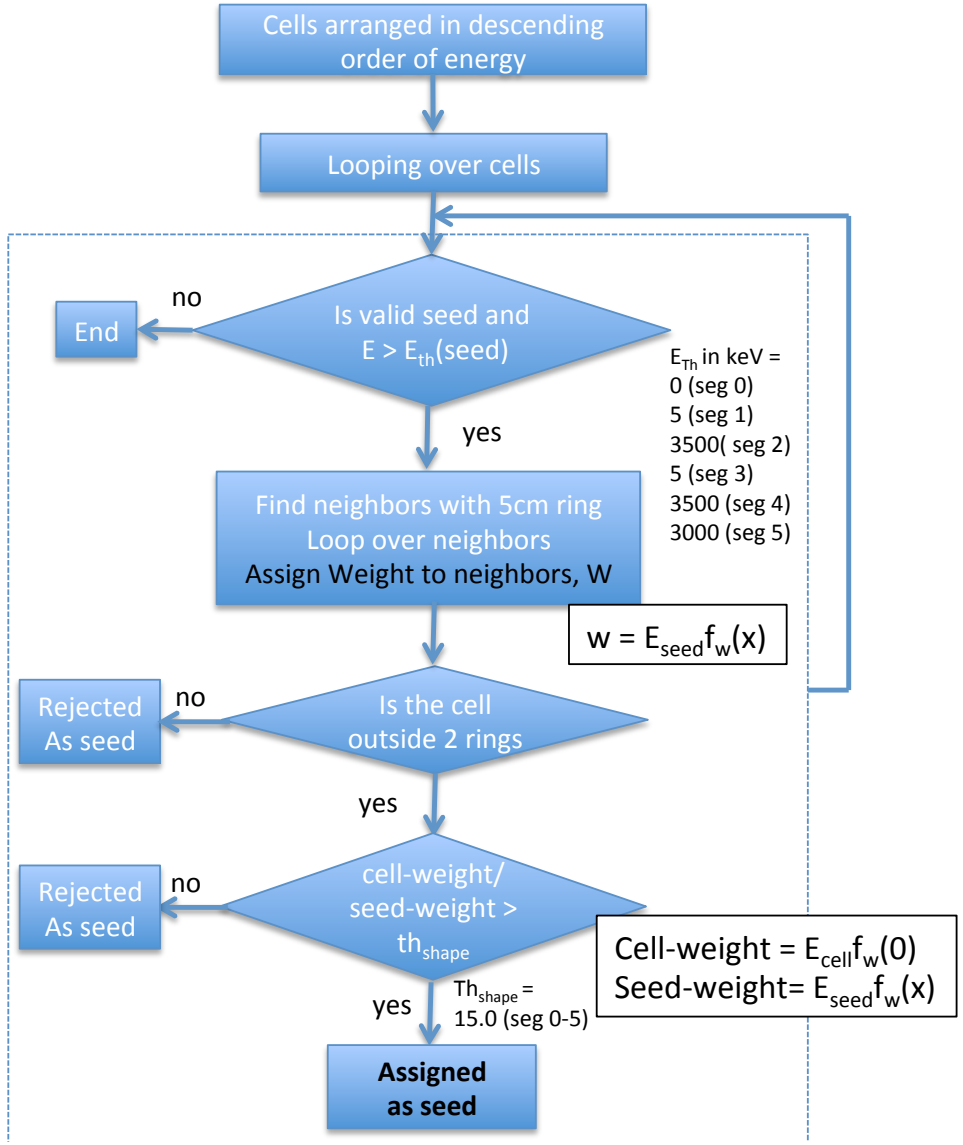
For the software developments, we should keep in mind that we need people that know a bit their way around O2 and have a good C++ knowledge. We can provide ofcourse guidance and support to some extent, but they should also be able to work independently to a good degree.

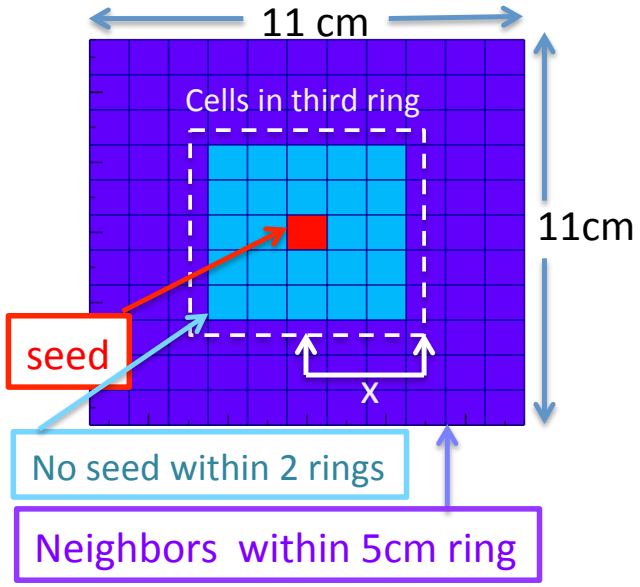
Thank you

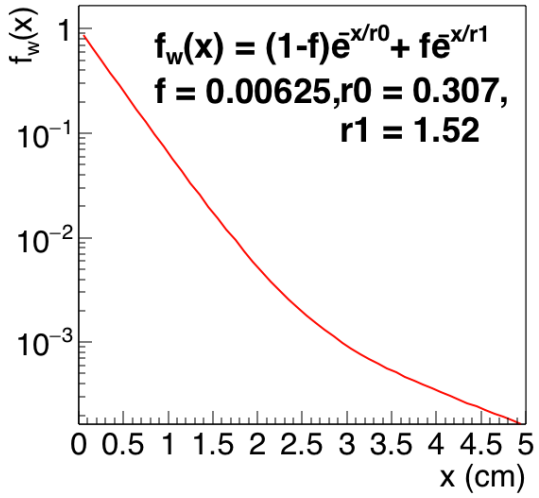
Simulation effort and chains …

- Old way of running chain might continue as long as O2 framework is ready
- We are understanding clustering and shower profile in old framework and would implement the improvements made in O2 at later stage
- There were discussions to show simulation chain running in local and grid in this meeting. However, we might discuss offline in zoom meeting since the in new scenario of transition to the O2 framework, it might be judicious to put more effort in FoCal O2 developmental task.

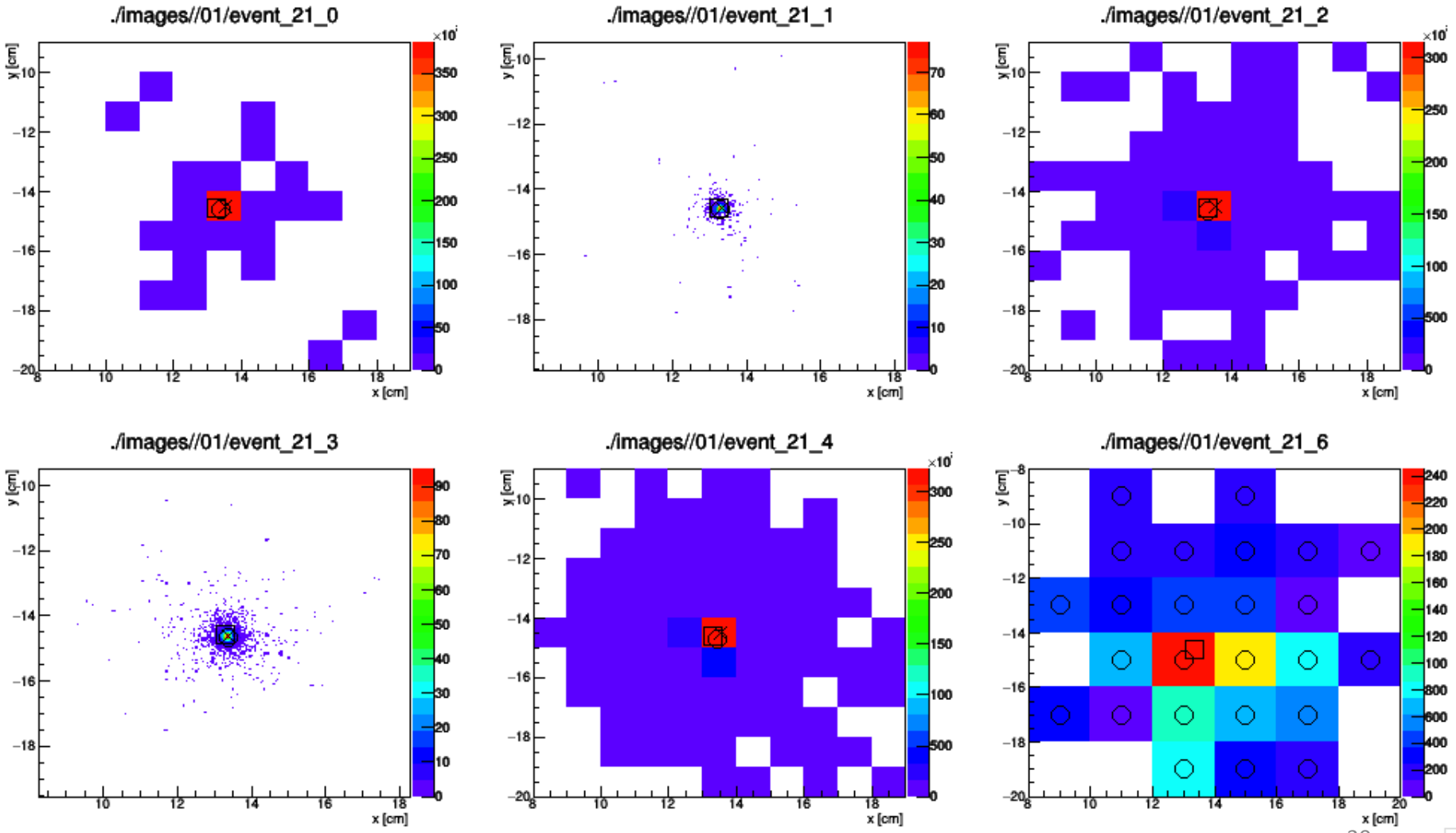
(FoCal): Letter of Intent contribution (NISER)





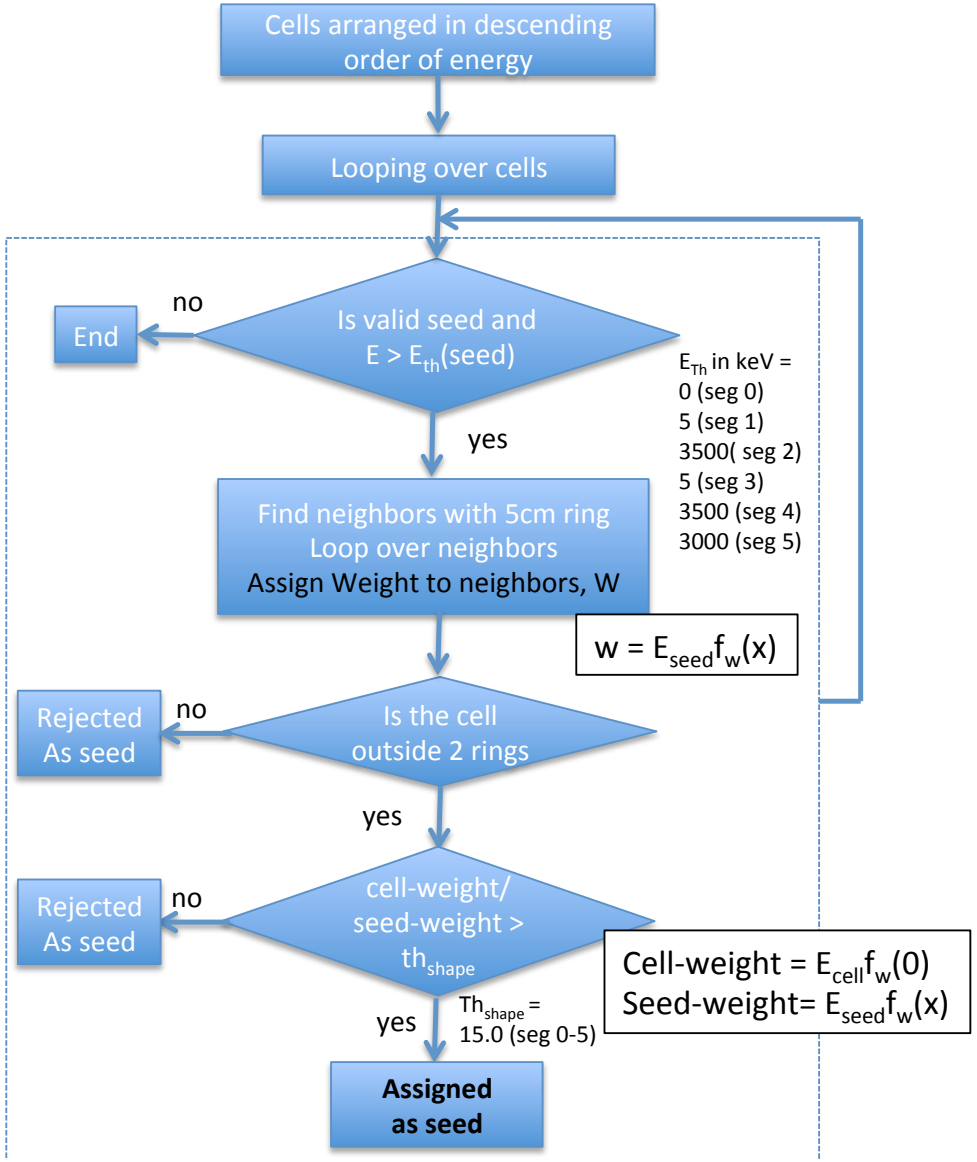


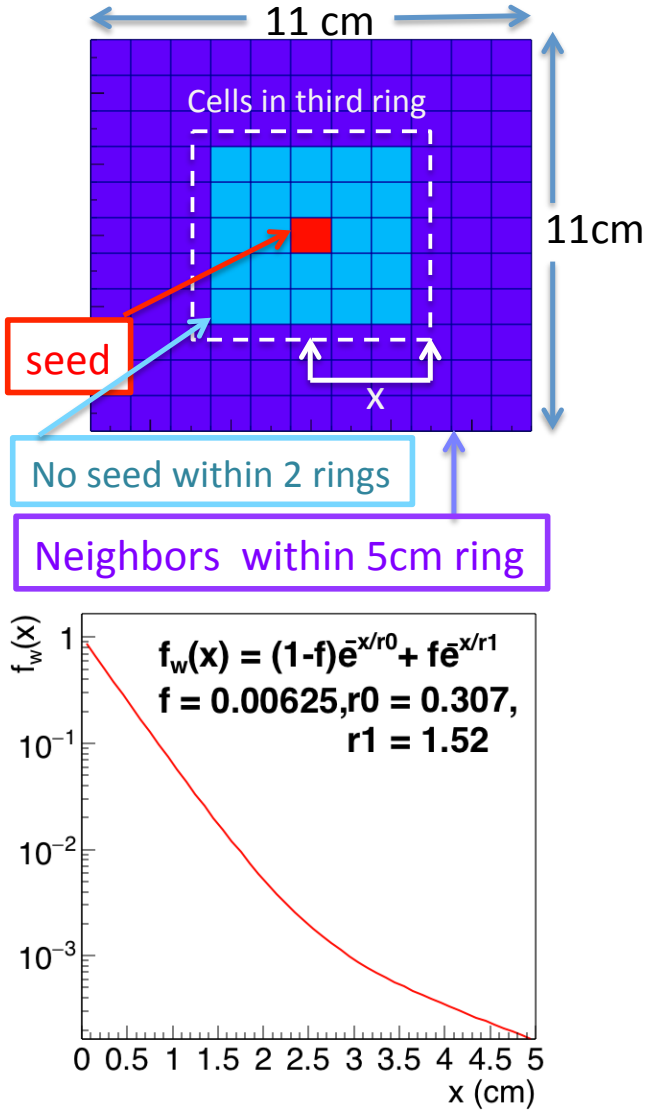
Clustering algorithm



30

Looking for seeds and added weight to corresponding neighbors





FoCal Geometry