Progress with ALICE MasterClasses

Yiota Foka
on behalf of the WG

Pavle Vulanovic (summer student)
Piotr Nowakowski; Lukasz Graczykowski, Małgorzata Janik (WUT)

Summary

- Updates with ALICE Strangeness MC: by Piotr/WUT
- New MC on femtoscopy source size measurement by SumStud/WUT
- Demo/Tutorial for Summer Students on Fri 30 July at 10:30

Presentations and Recordings are here
https://indico.cern.ch/event/1063426/

Regular meetings every Monday

With participation of Leo/CBM (who left):
CBM status as before
(these updates were not implemented for CBM)

From: Piotr Nowakowski
Sent: 07 July 2021 15:00
Subject: [Indico] [Event reminder] MC Summer Student Report (07/07/2021, 17:00 Europe/Zurich)

Please note that the event "MC Summer Student Report" will start on 7 Jul 2021, 17:00 (Europe/Zurich).

You can access the full event here:
https://indico.cern.ch/e/1056851

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Indico :: Email Notifier
https://indico.cern.ch/e/1056851

New ALICE MC on measurement of QGP source size

“Femtoscopy masterclass”

New measurement prepared as a CERN summer student project
by Pavle Vulanovic from the New York University Abu Dhabi,
who worked under WUT supervision
financed by private sponsor EO “Three Physicists foundation”.

This is a standard measurement/tool related to obtaining the source size
of the QGP droplet created during the lead collisions.

It is based on the analysis of two-particle (two-pion) correlations in momentum space (based on momentum differences of two particles).

Because the source size is very small, at the scale of femtometers, it is called femtoscopy.

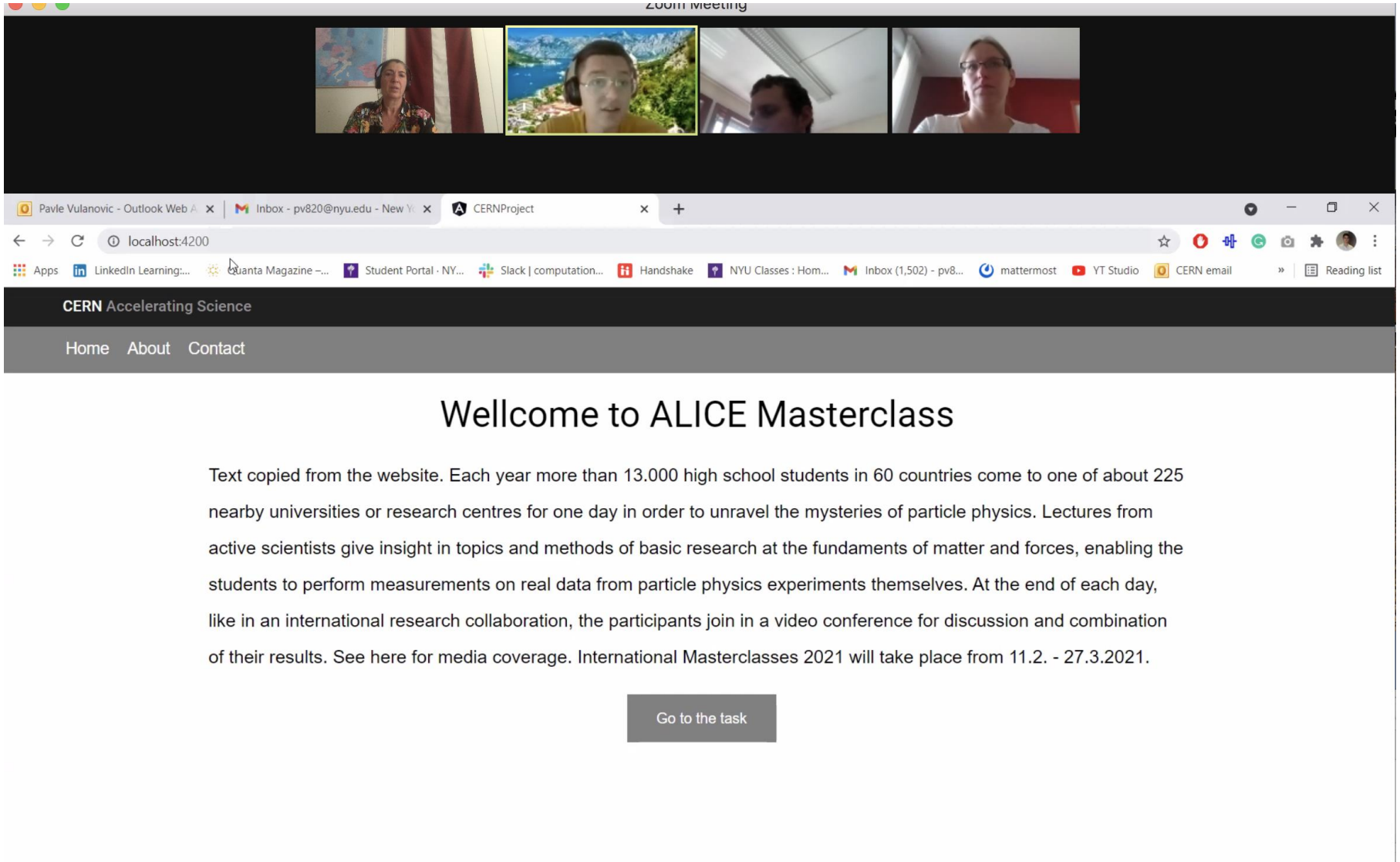
The difficulty can be tuned to address university students or in a very simplified way high school students.

A first prototype was presented during summer for several summers students (ALICE summers students plus the dozen supported by EO

https://indico.cern.ch/event/1063426

Instructions delivered as summer student report in CDS

Source Size (femtoscopy) measurement
Explanation, Instructions, Presentations via the web page: example



Correlation function:
how to get the radius of the source

$$k^* = \frac{p_1 - p_2}{2}.$$

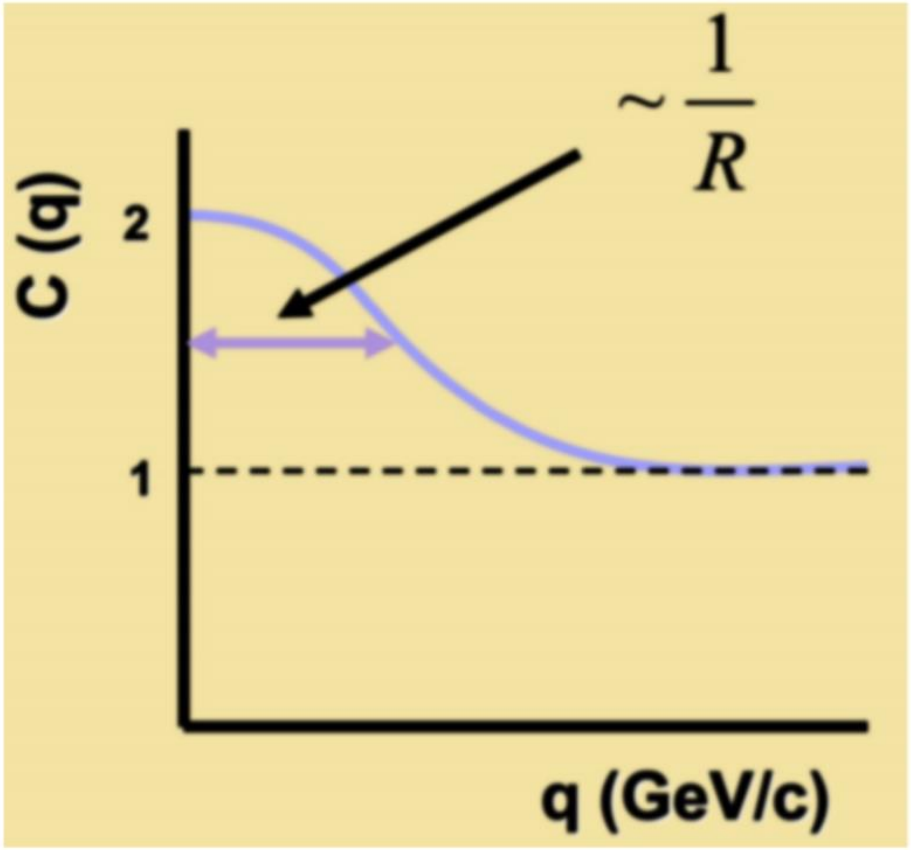
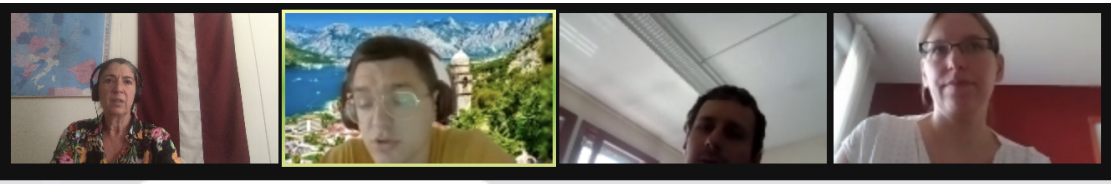


Figure 2.1: The k^* distribution.



Pavle Vulanovic - Outlook Web A | Inbox - pv820@nyu.edu - New Y | CERNProject

localhost:4200/femto-large-scale-analysis

Apps | LinkedIn Learning:... | Quanta Magazine –... | Student Portal · NY... | Slack | computation... | Handshake | NYU Classes : Hom... | Inbox (1,502) - pv8... | mattermost | YT Studio | CERN email | Reading list

CERN Accelerating Science

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5-10%

Divide Histograms

Select range to normalize

0 0.07 0.15 0.2

Submit ?

Minimum

Maximum

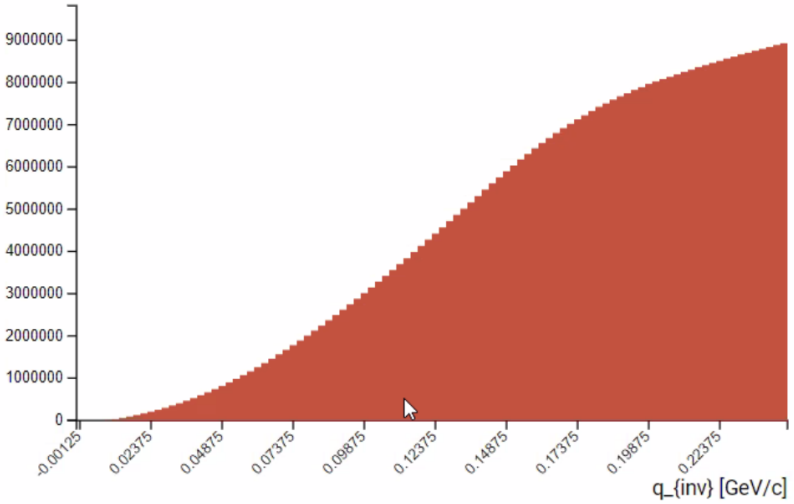
Submit

Choose the Best Fit

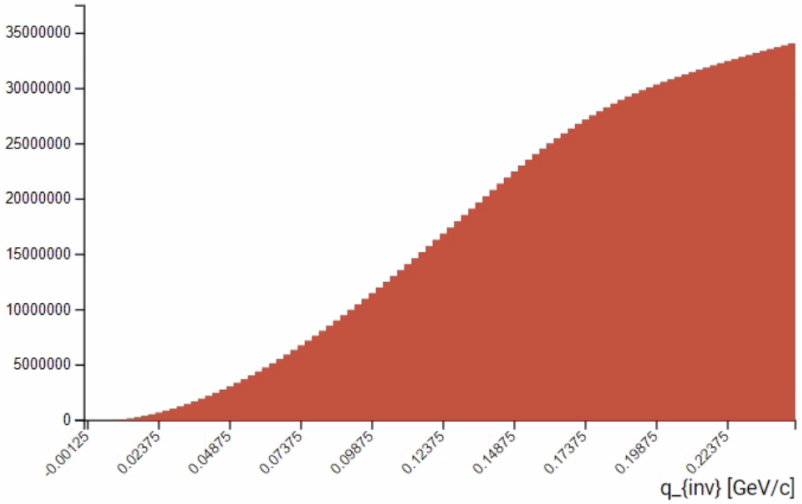
Choose R value

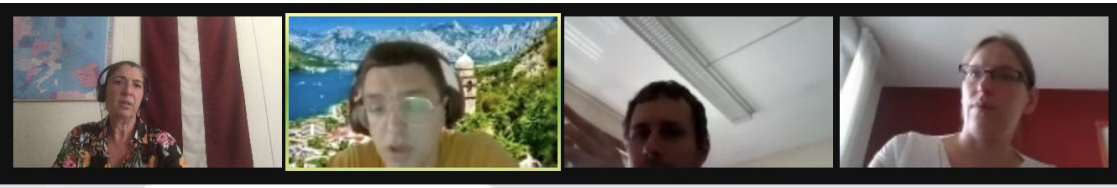
Accept ?

Numerator



Denominator





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Choose the Best Fit

Choose R value

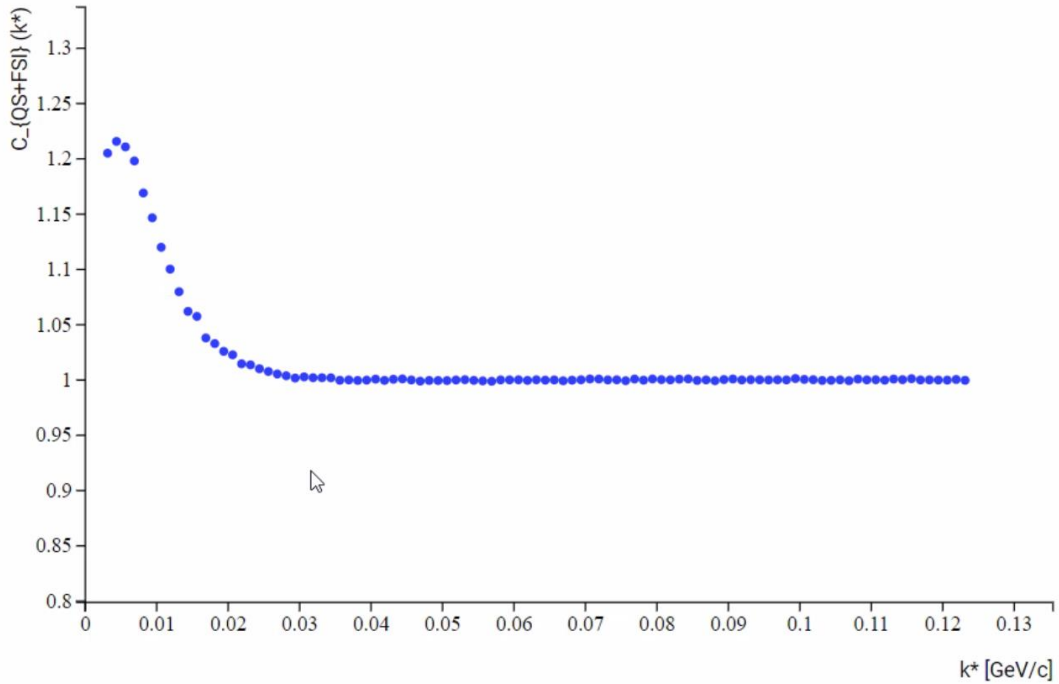
Accept ?

-0.00125 0.02375 0.04875 0.07375 0.09875 0.12375 0.14875 0.17375 0.19875 0.22375

q_{inv} [GeV/c]

-0.00125 0.02375 0.04875 0.07375 0.09875 0.12375 0.14875 0.17375 0.19875 0.22375

q_{inv} [GeV/c]



Zoom Meeting

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localhost:4200/femto-large-scale-analysis

Apps | LinkedIn Learning:... | Quanta Magazine –... | Student Portal · NY... | Slack | computation... | Handshake | NYU Classes : Hom... | Inbox (1,502) - pv8... | mattermost | YT Studio | CERN email | Reading list

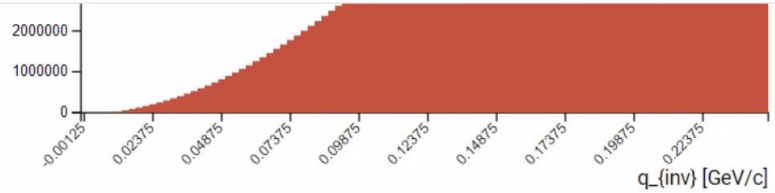
Maximum

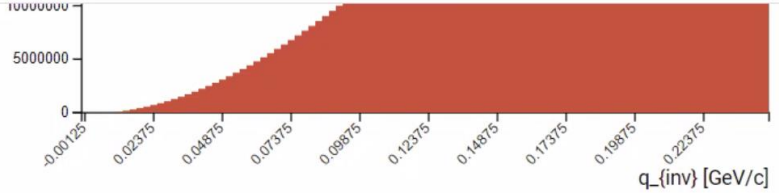
Submit

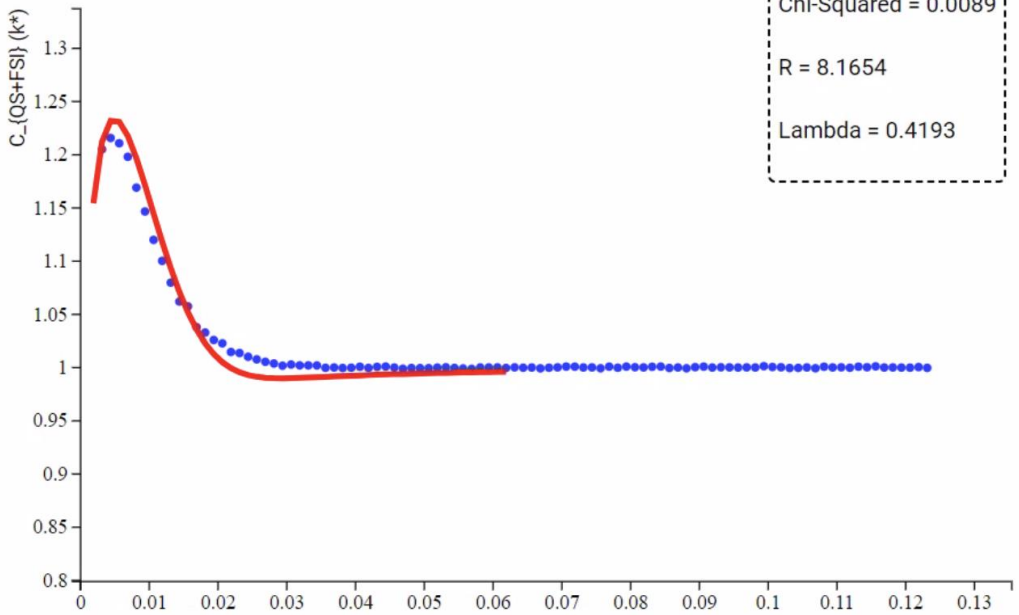
Choose the Best Fit

R = 8

Accept ?







Chi-Squared = 0.0089

R = 8.1654

Lambda = 0.4193

R	Multiplicity
8.1654	1294

Plot

50-60%

Divide Histograms

Select range to normalize

0 0.07 0.15 0.2

Submit ?

Minimum

Maximum

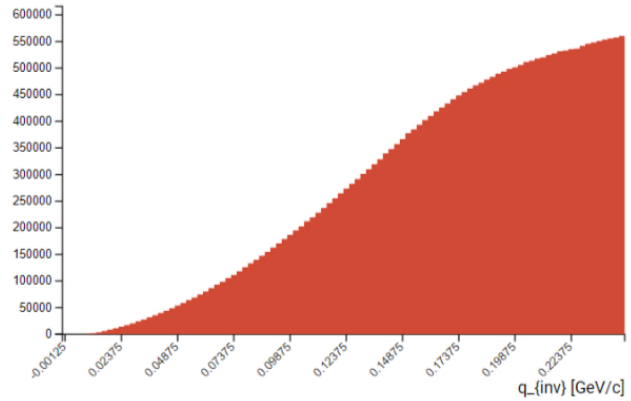
Submit

Choose the Best Fit

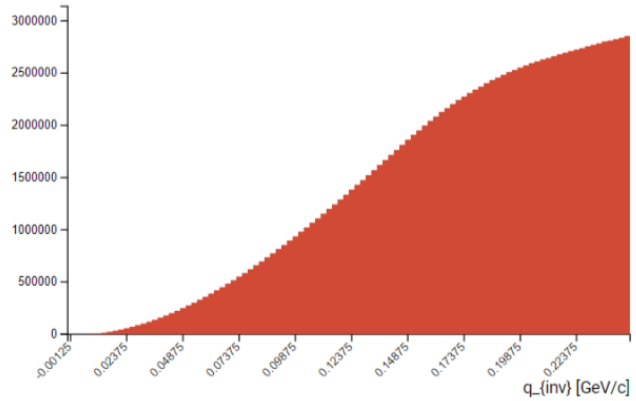
R = 5

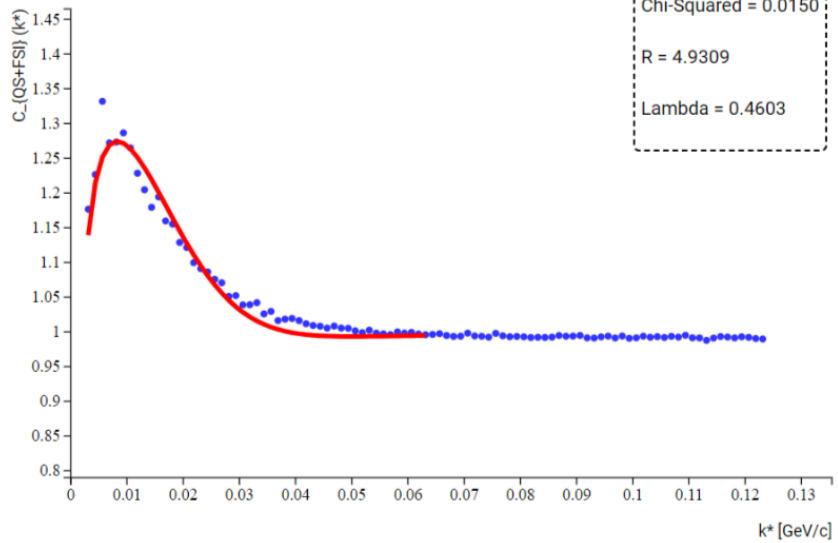
Accept ?

Numerator



Denominator





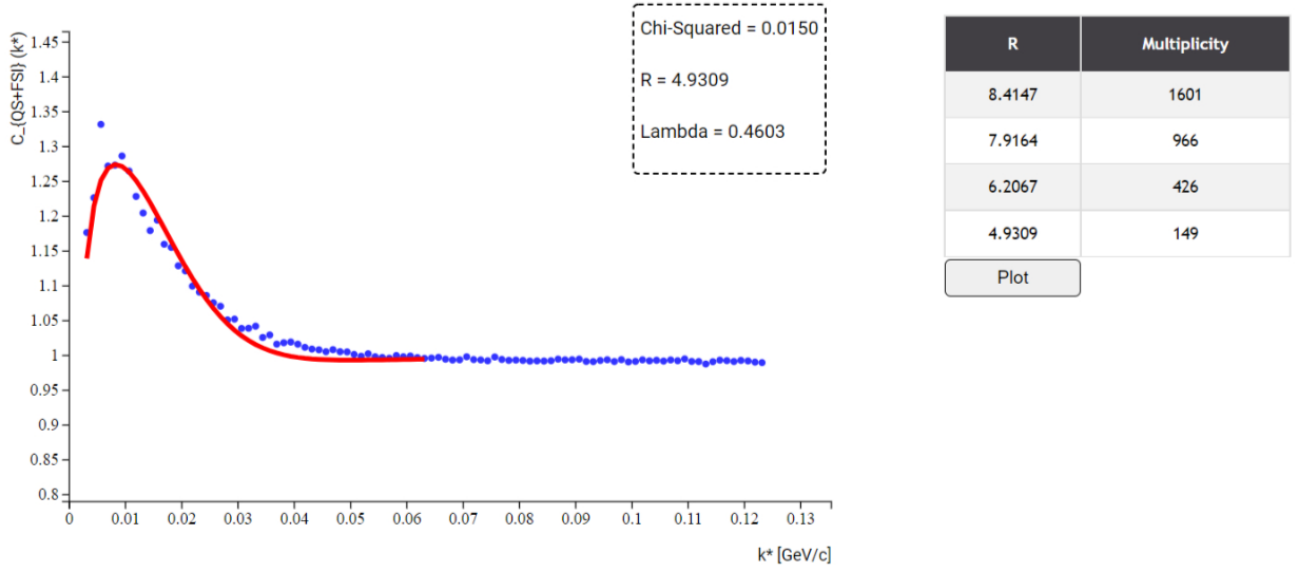
Chi-Squared = 0.0150

R = 4.9309

Lambda = 0.4603

R	Multiplicity
8.4147	1601
7.9164	966
6.2067	426
4.9309	149

Plot



R	Multiplicity
8.4147	1601
7.9164	966
6.2067	426
4.9309	149

Plot

Centrality	$dN_{ch}/d\eta$	$\langle N_{part} \rangle$	$(dN_{ch}/d\eta) / (\langle N_{part} \rangle/2)$
0–5%	1601 ± 60	382.8 ± 3.1	8.4 ± 0.3
5–10%	1294 ± 49	329.7 ± 4.6	7.9 ± 0.3
10–20%	966 ± 37	260.5 ± 4.4	7.4 ± 0.3
20–30%	649 ± 23	186.4 ± 3.9	7.0 ± 0.3
30–40%	426 ± 15	128.9 ± 3.3	6.6 ± 0.3
40–50%	261 ± 9	85.0 ± 2.6	6.1 ± 0.3
50–60%	149 ± 6	52.8 ± 2.0	5.7 ± 0.3
60–70%	76 ± 4	30.0 ± 1.3	5.1 ± 0.3
70–80%	35 ± 2	15.8 ± 0.6	4.4 ± 0.4

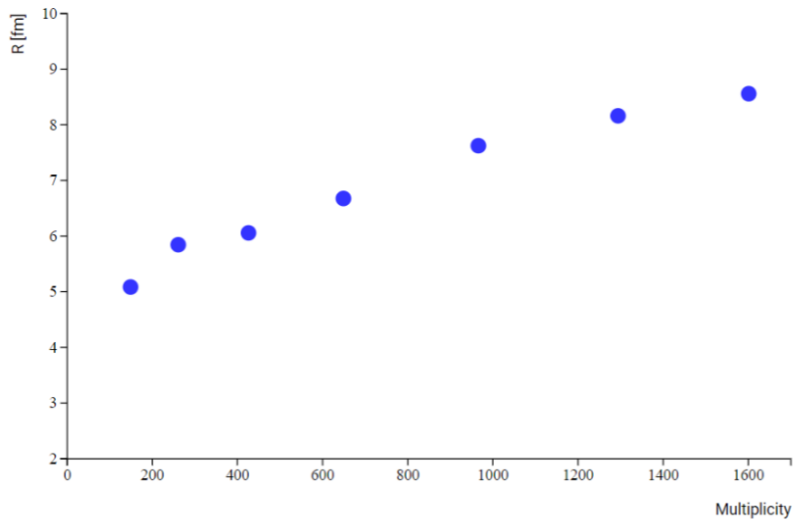


Figure 7.10: An example of the Radii vs Multiplicity plot.

Strangeness MasterClass New Developments

New and much more advanced online version now, with student and teacher's modes:
- student mode: https://alice-web-masterclass.app.cern.ch
- teacher's mode: https://teacher-alice-web-masterclass.app.cern.ch/

The application contains now a back-end database for storing events (i.e. event at a given institute)
and sessions (i.e. multiple rooms to which students are divided within one event).
All the results are being pushed automatically to the database and can be stored permanently.
The teacher's mode contains a front-end administration GUI of the database.
It can be accessed only with CERN login and allows for creation of events and sessions.
For each session an automatic link and password is generated which can be provided to students.
All the results which are pushed by students to the database can be visualized live in the teacher's mode.
All the calculations for combining the results are done in the teacher's mode now.

The final result is no need for use of any Google Docs or other external tools for storing the results.

Updates on ALICE Strangeness: prototype for testing

Piotr Nowakowski

Inbox 12 July 2021 11:42

> Dear all,
>
> a prototype version of new version of the ALICE MasterClass is now available for testing & feedback:
>
> https://alice-masterclass2.app.cern.ch/ (student site)
>
> https://teacher-alice-masterclass2.app.cern.ch/ (teacher site, requires CERN login)
>
>
> Quick instructions:
>
> 1. Login to the teacher site
>
> 2. Create an "Event". An "Event" represents a whole gathering of students, for example "WUT-2020".
>
> 3. Order each tutor to login and create a "Session" for her/himself. Each tutor should copy his link (from "URL" column) and distribute it to students (going to the student website via this link automatically enters the password on the student website, allowing the student to input only the student ID number - this mechanism hopefully should prevent typos and frustration)
>
> 3. From the menu on the left select visual analysis or large scale.
>
> Visual analysis allows you to show compounded mass histograms. You can select which result from which student you want to include/exclude from the histograms. You have to use the refresh button (circle-arrow) to update the list of available results.
>
> Large Scale analysis allows you to show the strangeness enhancement. You can force the update of available results by using the refresh button, but you don't have to - it automatically does that every 10 seconds.