Run QA of the SPS data including runs with back bias voltage
Introduction

Compare parameters between runs taken at same energy:

• Average cluster size $\bar{S}_{\text{clus}}$
• Mean of number of cluster distribution $\mu_{\text{clus}}$
• Mean of number of hit distribution $\mu_{\text{hit}}$
• Maximum of a gamma distribution fitted to the longitudinal shower profile $t_{\text{max}}$
Average cluster size

- Runs before back bias is applied have similar cluster size.
- Runs taken immediately after back bias is applied have smaller cluster size.
Average cluster size

Lane 49 excluded

Back bias intervention

3V (maybe -3V) 0V -3V

Lane 49 excluded

Back bias intervention

Johannes Keul

EPICAL-2 analysis meeting
Mean of number of cluster distribution

- Similar $\mu_{\text{Clus}}$ across all runs, including runs with back bias for 20, 80 and 120 GeV
- Runs with different number of clusters for 40 and 60 GeV
- Run 3116 at 30 GeV by almost 30% off
Mean of number of cluster distribution

- Similar $\mu_{\text{Clus}}$ across all runs, including runs with back bias for 20, 80 and 120 GeV
- Runs with different number of clusters for 40 and 60 GeV
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Lane 49 excluded
Mean of number of cluster distribution

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- Runs with different number of clusters for 40 and 60 GeV
- Run 3116 at 30 GeV by almost 30% off
Mean of number of hit distribution

- Runs before back bias is applied have similar number of hits
- Runs after back bias is applied have lower number of hits
- Correlations between number of hits and cluster size?
Maximum of the longitudinal profile

- After back bias intervention: calibration seems to be not working anymore → has to be done again

Before back bias intervention

After back bias intervention

Back bias: 0V
Lane 49 included
Maximum of the longitudinal profile

- After back bias intervention: calibration seems to be not working anymore → has to be done again
- Similar $t_{\text{max}}$ across all runs at 20, 30, 80 and 120 GeV
- Runs with lower $t_{\text{max}}$ at 40 and 60 GeV after back bias intervention
Maximum of the longitudinal profile

- After back bias intervention: calibration seems to be not working anymore
- Similar \( t_{\text{max}} \) across all runs at 20, 30, 80 and 120 GeV
- Runs with lower \( t_{\text{max}} \) at 40 and 60 GeV after back bias intervention

[Diagram showing \( t_{\text{max}} \) distribution across runs with back bias intervention at 3V (maybe -3V), 0V and -3V. Lane 49 is excluded.]
Summary

- Runs before back bias intervention are similar to each other
- After back bias intervention with 0V applied the cluster size is decreased
- With back bias set to -3V cluster size is increased
- Lane 49 exclusion has an impact on all comparison parameters

To Do:
- Make an excel sheet with the run conditions
- Make sure the run conditions are correct
Backup
Average cluster size
Mean of number of cluster distribution
Mean of number of hit distribution
Maximum of the longitudinal profile

- \( e^-, 20 \text{ GeV} \)
- \( e^-, 30 \text{ GeV} \)
- \( e^-, 40 \text{ GeV} \)
- \( e^-, 60 \text{ GeV} \)
- \( e^-, 80 \text{ GeV} \)
- \( e^-, 120 \text{ GeV} \)