

First look at the cluster size of ITS and TPC-ITS tracks

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ITS Coordination Board, 17/01/22

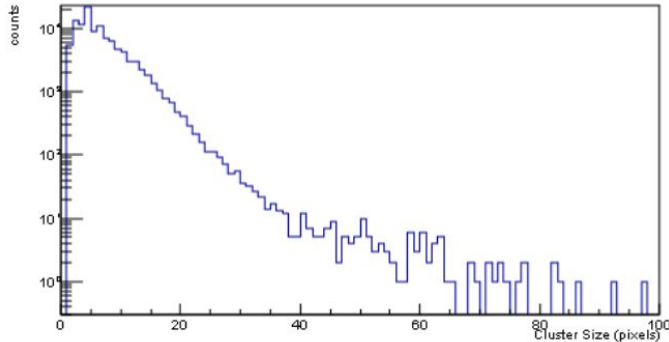
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ALICE

Goals

- In pilot beam data, non-negligible amount of **large-sized cluster** was observed
 - Investigations are necessary to understand the origin of the clusters and address the issue looking forward to next data-taking



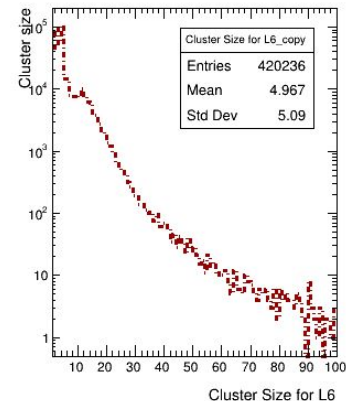
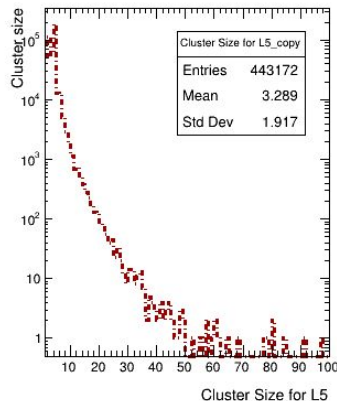
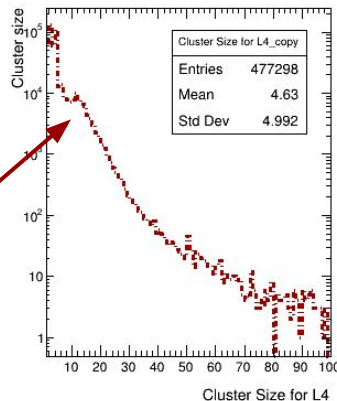
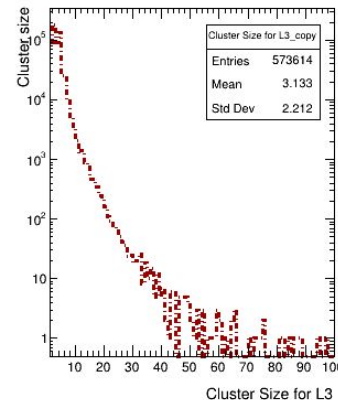
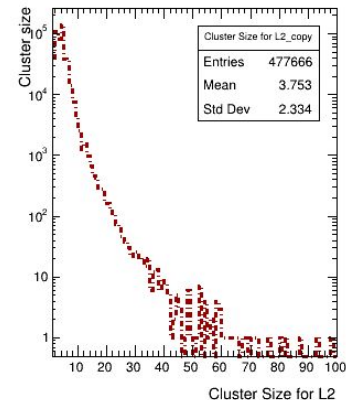
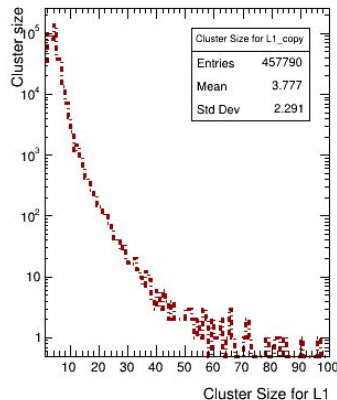
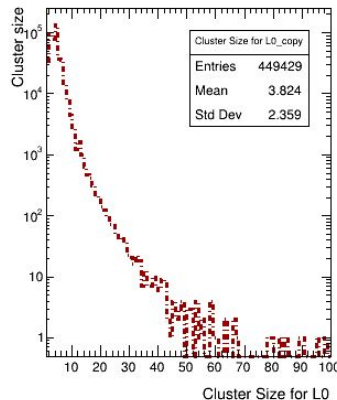
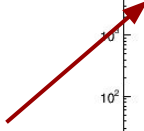
https://indico.cern.ch/event/1110713/contributions/4671247/attachments/2370050/4047671/ClusterTask_rare_topologies.pdf

- Are those clusters used also in the tracking?
- Can we use the cluster topology / size information to improve our tracking algorithm?
 - Study started last week: **F.Mazzaschi, S.Politanò**

ITS-SA tracks: cluster size

- ITS SA tracks: # of clusters > 15 is ~ 0.2% for L0, L1, L2, L3, L5 and ~3% for L4 and L6

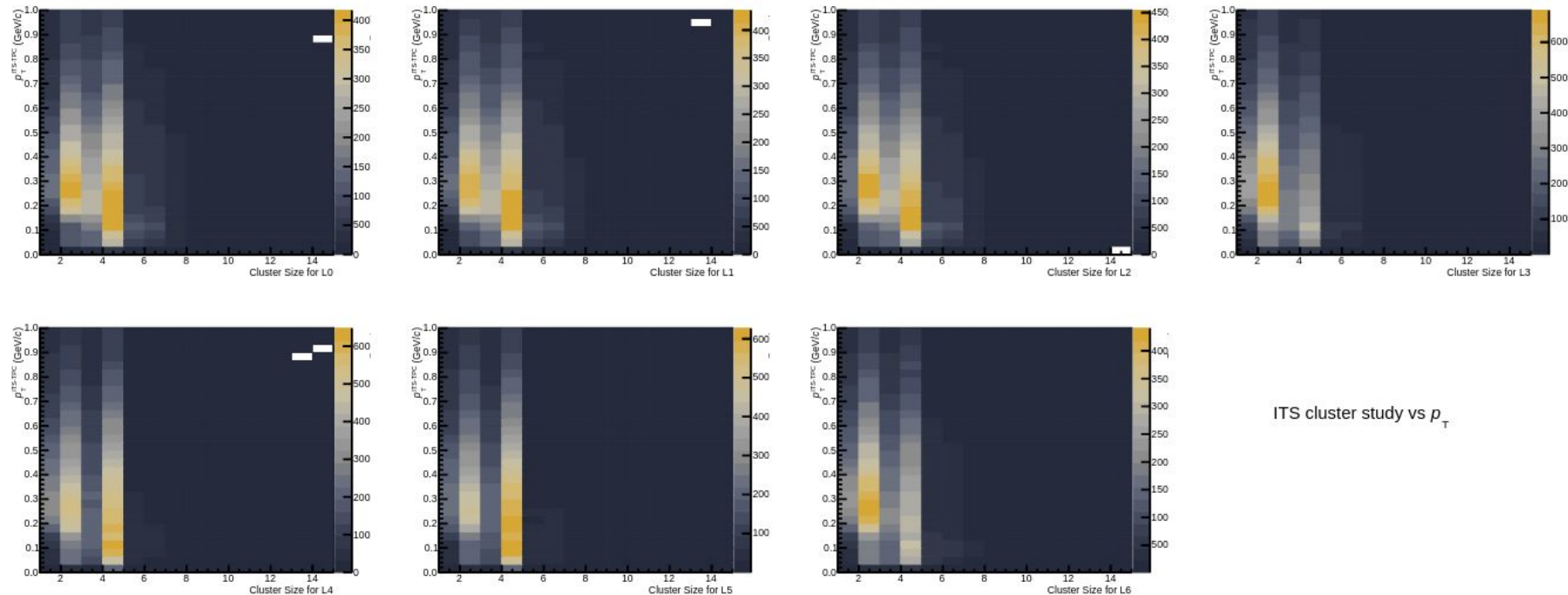
- Is this expected?



ITS cluster size, ITS SA tracks

ITS-TPC tracks: p_T vs. cluster size

- p_T and η differential cluster size studied
- Used ITS-TPC tracks only, since momentum resolution of ITS-Tracks is not reliable with the detector misaligned

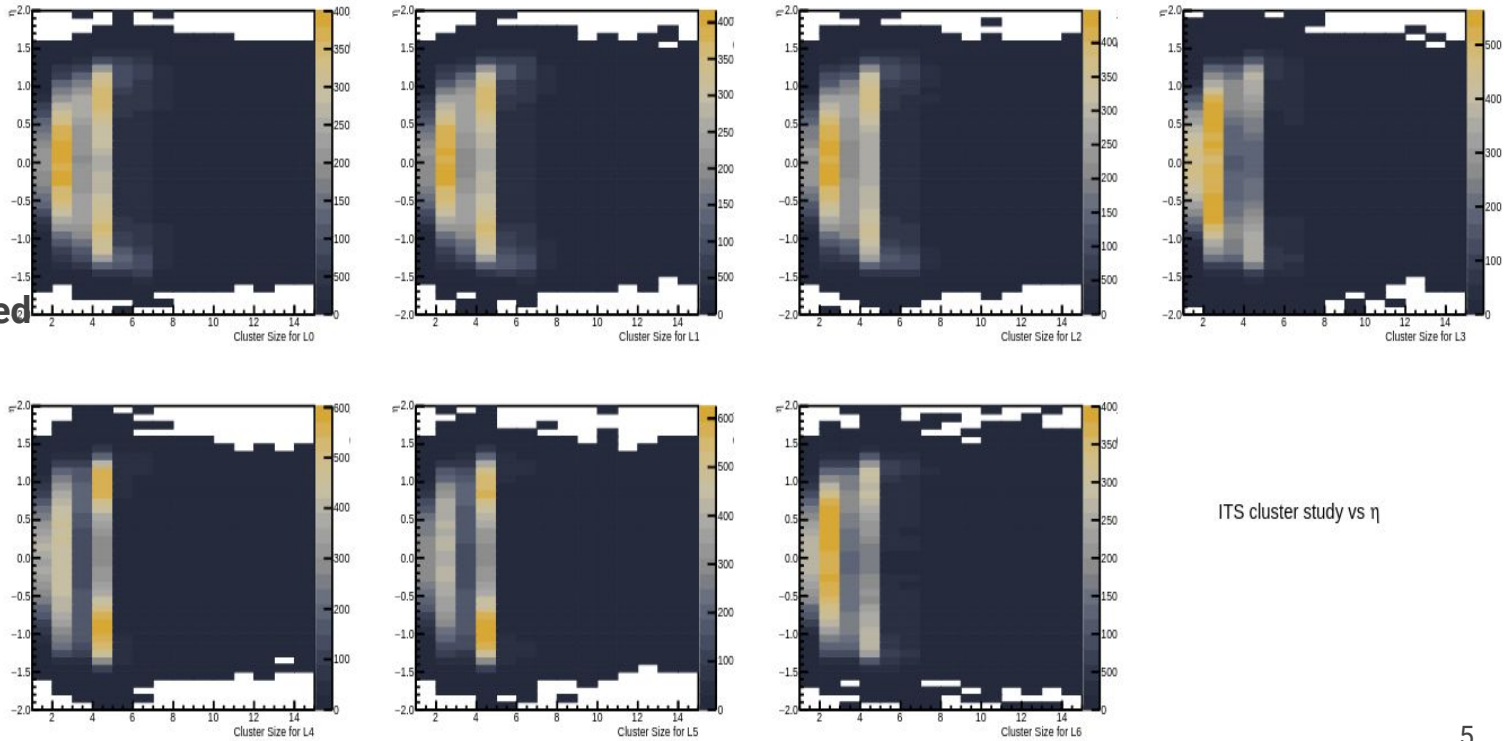


ITS cluster study vs p_T

ITS-TPC tracks: η vs. cluster size

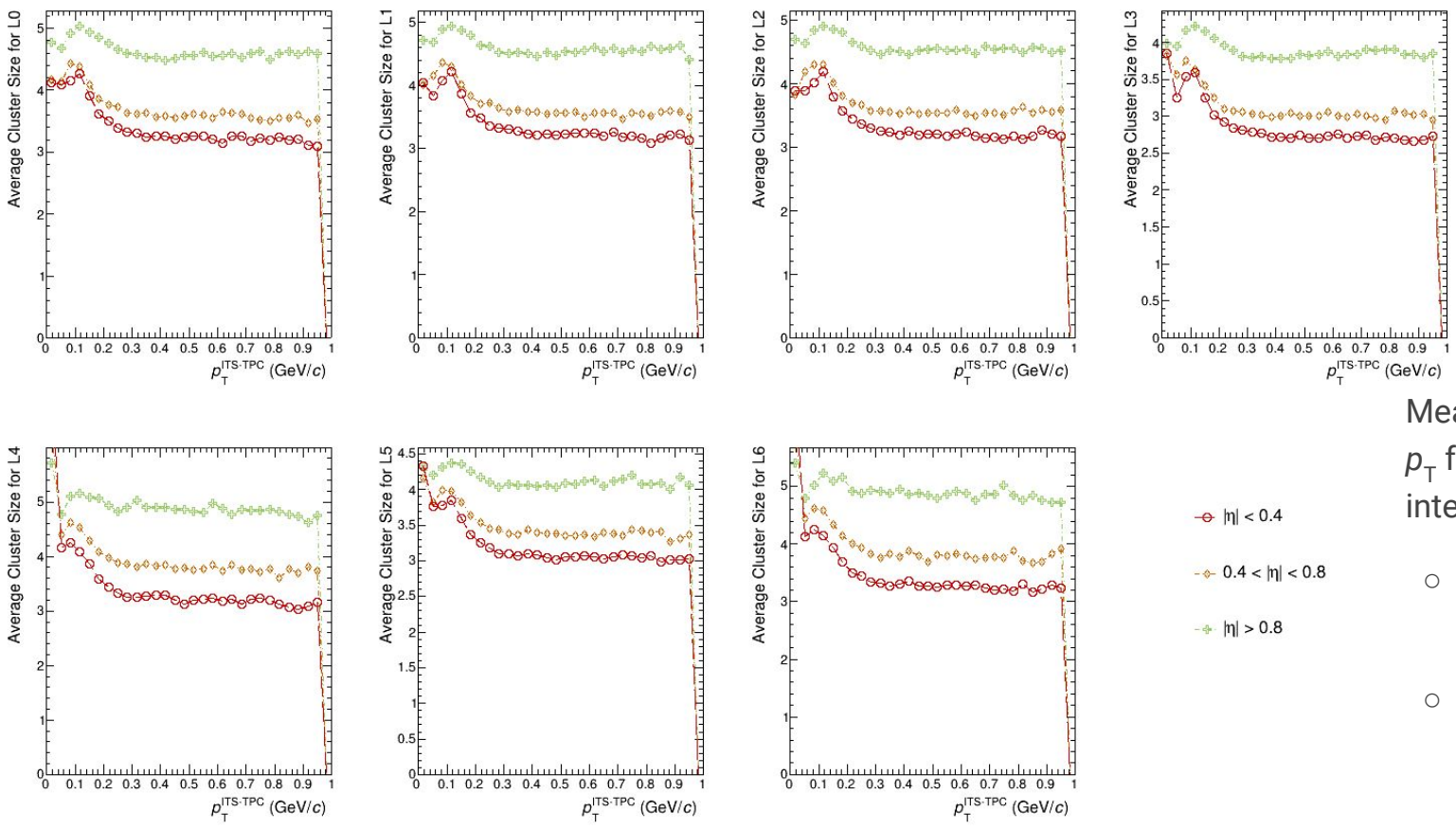
- p_T and η differential cluster size studied
- Used ITS-TPC tracks only, since momentum resolution of ITS-Tracks is not reliable with the detector misaligned

- **Large η values associated with higher cluster sizes as expected**



ITS cluster study vs η

Mean cluster size vs. p_T



Mean cluster size over p_T for 3 different η intervals:

- $|\eta| < 0.4$
- ◇ $0.4 < |\eta| < 0.8$
- ◆ $|\eta| > 0.8$

- **nice η ordering observed**
- larger η intervals corresponds to larger mean cluster size in almost full p_T range

Outlook

- First look at the clusters employed for the tracking
 - small fraction of clusters with size > 15 for L0, L1, L2, L3, L5
 - 3% for L4 and L6 -> to be investigated
 - cluster size vs p_T and η studied
 - ITS-TPC tracks employed
 - η ordering observed
- Few preliminary results obtained, goals for the next weeks:
 - analyse more runs with different magnetic field conditions
 - understanding the nature of big clusters
 - η dependency of IB-only tracks