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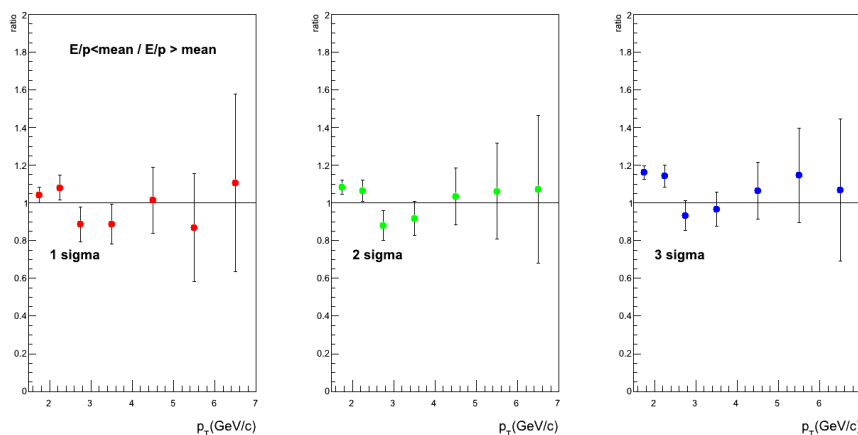
Execute Summary

- This is a page for the execute summary of 01272012
- The current understanding is:
 - ◆ The trivial observation is that the small stat sample causes difficulties to draw strong conclusions - these remain rather conservative
 - ◆ The estimations of hadron contamination of the electron sample after E/p cut is ~7-9% with a generous uncertainty of 4%.
 - ◆ The 10-20% difference between the efficiencies derived from MC and V0 is caused by the efficiency in cluster-track matching with some contribution from E/p cut - both of these are sensitive to hadron contamination. By comparison of the cluster-track matching efficiencies with another data sample - LHC11a LHC11a (in the pT of interest - where the plateau is reached - easiest to conclude) we see that:
 - ◇ the V0 efficiency from data (c-t matching) shows a dependence as for **inclusive** track-matching (any particle - so in electron jargon : hadron contaminated) - somewhat below 0.8
 - ◇ whereas the efficiency from MC shows values typical for purified electron candidates - above 0.8
 - ◆ The above observation points to MC efficiency is to be used, however, of course the efficiency for V0s in MC will be investigated and compared to data - to be done right away. Also the closer investigation of at the E/p within the V0 sample in data will be made - this would be a good consistency check for the contamination of the electron sample in V0 selections.
 - ◇ However, the E/p in V0 indicates the sample is very clean
- The resulting x-section is shown.
 - ◆ calculated for MC driven efficiency and V0 driven efficiency which are consistent within the systematic uncertainties. The resolution to the question of the residuals should indicate which of the curves are to be used as THE result.
 - ◆ stable in 20 % uncertainty in inclusive electron level. Large discrepancy at low pT due to the large HFE contribution

Hadron contamination & electron yields from E/p distribution

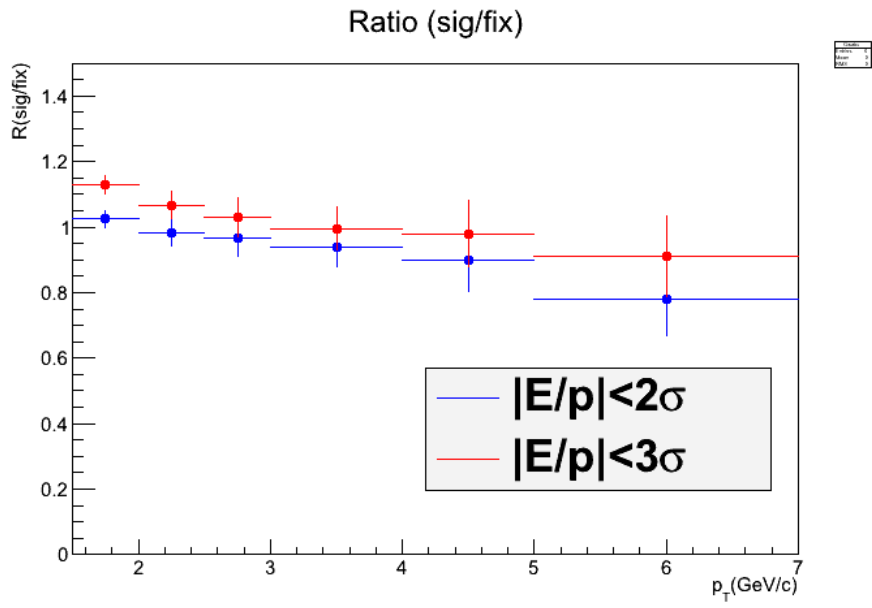
The relative ratios of integrals in the upward vs downward of the signal within the E/p peak

- Integrated E/p distribution from -n sigma to mean (downward) and from mean to n sigma (upward), and calculate the ratio downward / upward
 - ◆ E/p distribution
 - ◆ mean and Sigma
- The ratio deviating from 1 indicated asymmetry of the integrals:
 - ◆ low-pT: hadron contamination seen in the n-sigma selection - directly seen in the E/p distributions - the hadron tail under the gaussian peak (see E/p fits)
 - ◆ at high-pT the extracted ratio is consistent with 1 within the stat error bars but the deviation from 1. - especially for the 3sigma selection does indicate a systematic effect - but within the taken into account in the contamination estimation and uncertainty



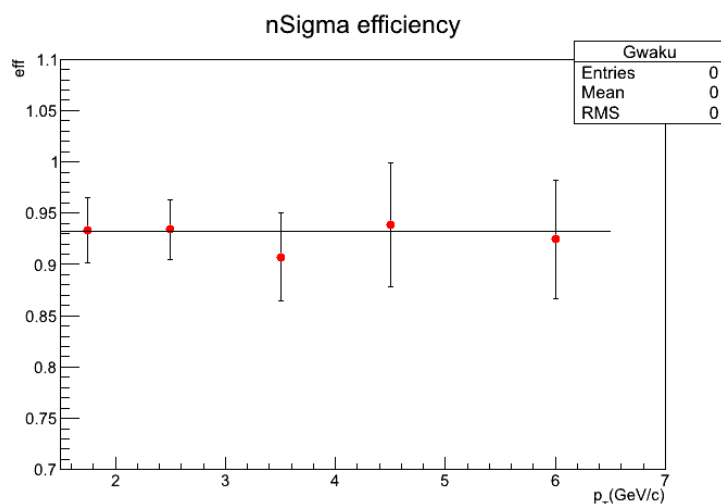
Raw yield extraction from E/p cut based on n sigma cut

- Compared electron yields between n sigma cut ($-3 \text{ sigma} < E/p < 3 \text{ sigma}$) & fix cut ($0.8 < E/p < 1.3$)
 - ◆ denominator ; electron yields from $0.8 < E/p < 1.3$ / numerator ; electron yields from nSigma cut
- Expected difference between 2 sigma cut and 3 sigma cut is $\sim 4 \%$ - this plot below is consistent within 1-2% with this limit and that points to a systematic uncertainty on the signal extraction of this order. The low pT (3sigma selection) deviation from 1 is still caused by the hadron tail in E/p. The high pT deviation from 1 is on the order of 10% but consistent within the stat. error bars - one could consider assigning an uncertainty of few %.



Efficiency for TPC nSigma dE/dx

- extracted TPC nSigma dE/dx cut efficiency by fitting the distribution with gaussians.
 - ◆ https://twiki.cern.ch/twiki/bin/view/Main/01272012#nSigma_distribution_after_applyi
- the nSigma efficiency ($-1.5 < nSigma < 3.0$) extracted from the fits is constant at 93% (for all pT's)
 - ◆ expected from a Gaussian distribution

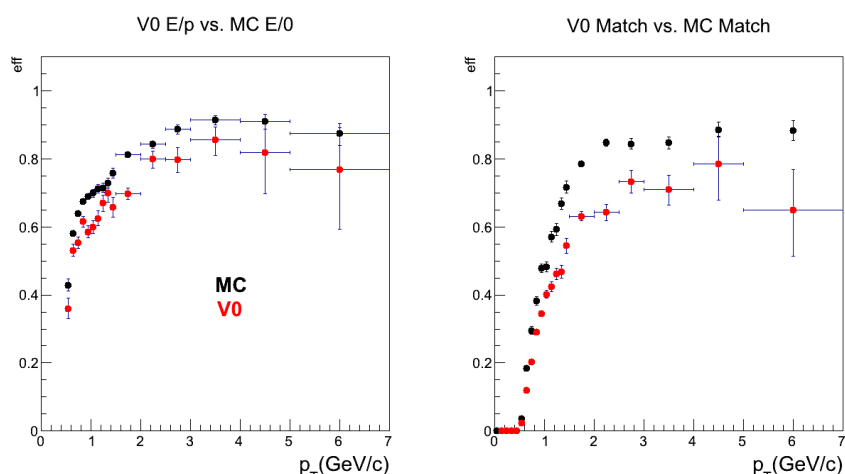


- the uncertainties extracted from variations of charge selection, rapidity ranges and E/p range show few to max 9.5% (relative) deviation but the deviation at high pT due to limited statistics. Adding +/- 5% uncertainty in the efficiency
 - ◆ https://twiki.cern.ch/twiki/bin/view/Main/01272012#nSigma_efficiency_1_5_nSigma_3_0
- Uncertainty from dE/dx nsigma variation was in <https://twiki.cern.ch/twiki/pub/Main/02012012/EMCalSummary.pdf> (page 11). Here only plot the uncertainty plot

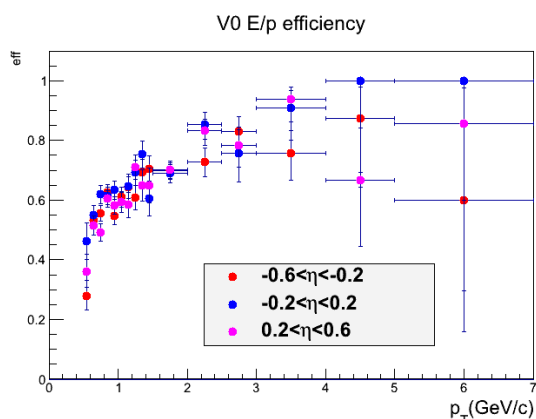
Efficiency for EMCal from V0 and MC

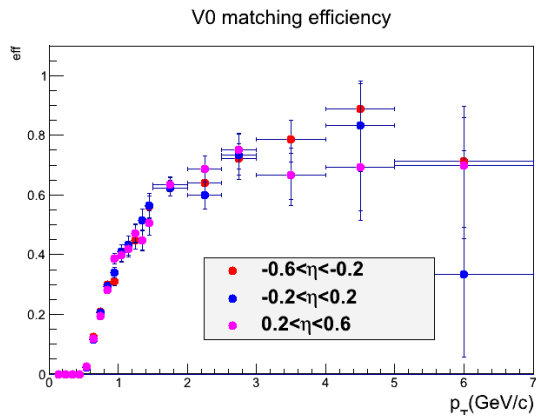
Efficiency from E/p and track matching from V0 and MC

- Note:
 - ◆ The **track matching** efficiency is purely track-by-cluster (geometry, detector perf., cluster cuts etc)
 - ◆ The **E/p** efficiency is efficiency of the E/p cut (after the track matching)
 - ◆ Both are sensitive to hadron contamination (and purity of the electron sample)
- Both efficiency show discrepancy at high pT
 - ◆ Track matching ; MC is similar to electron, and V0 is similar to inclusive electron from Rongrong's matching study
 - ◇ https://twiki.cern.ch/twiki/bin/viewauth/Main/Track-clusterMatching#Event_density_dependence
 - ◆ E/p ; Similar drop at high pT was observed in TPC nSigma dE/dx due to hadron contamination
 - ◆ Since V0 efficiency is lower than MC efficiency, the cross section corrected with the MC is higher. In addition that large non-HFE contribution enhance the difference
 - ◇ https://twiki.cern.ch/twiki/bin/view/Main/01272012#Comparison_HFE_cross_section_bet



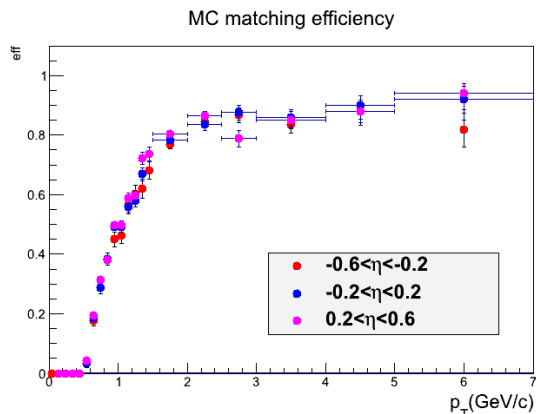
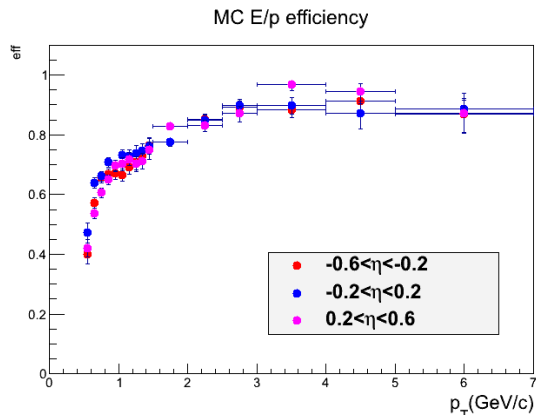
Pseudorapidity systematics: efficiency of E/p and matching from V0





- No eta dependence both Track matching and E/p cut at low p_T .
- At high p_T , some discrepancy was observed but the discrepancy is within error

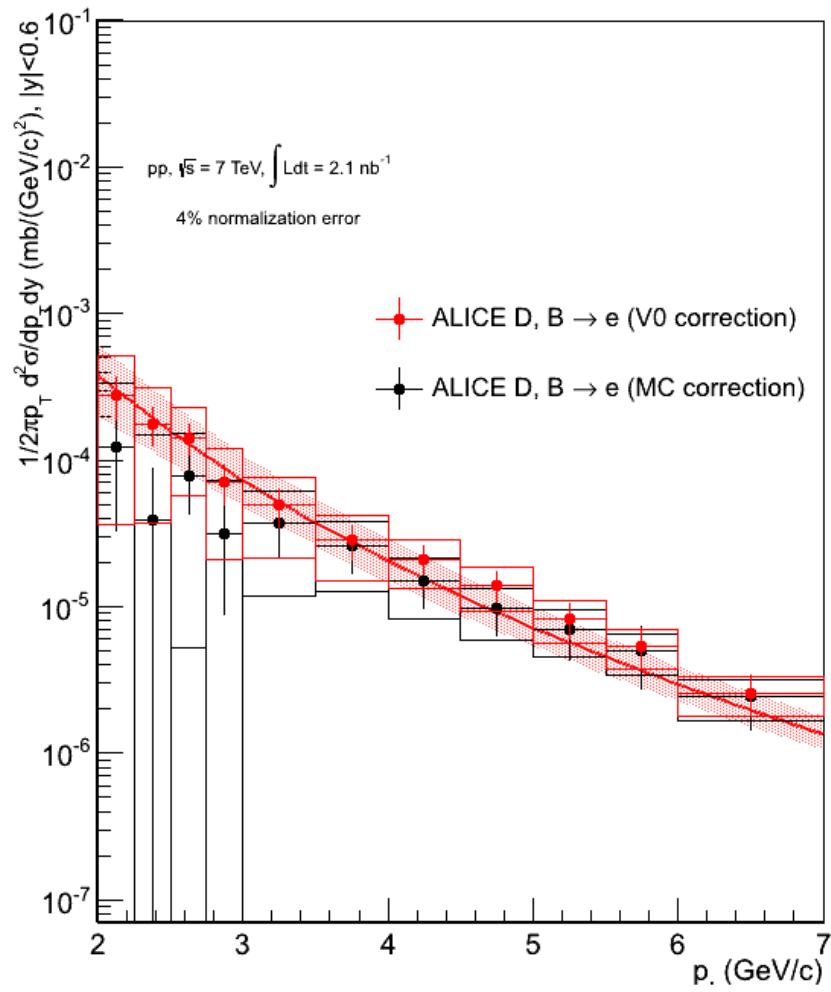
Pseudorapidity systematics: efficiency of E/p and matching from MC



- No eta dependence both Track matching and E/p cut

Results

HFE spectrum (corrected with 10f6a MB MC)



Further checks (Done)

- The comparison of efficiency (E/p and matching) from V0 and MC show the discrepancy at high pT. Following can help to understand the discrepancy:
 - ◆ Check E/p in V0 sample => E/p in V0
 - ◆ Compare V0 efficiency in data and MC => V0 efficiency
 - The E/p distribution in V0 sample in data indicates small hadron contamination in the sample.
 - V0 efficiency from data and MC show similar trend between V0 (data) and MC electrons.
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This topic: Main > 02012012

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