γ/π^0 Isolation Studies

Catherine Silvestre, Firas Abedelnabi

PWG-GA General Meeting
dedicated to γ/π^0-hadron correlations

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Intro

Aim

- Study the isolation dependence on the type of information {charged, neutral, both} used in the cone
- for γ, π^0 and decays
- vs. p_T (eta:phi)

Isolated fraction = isolated particle / all

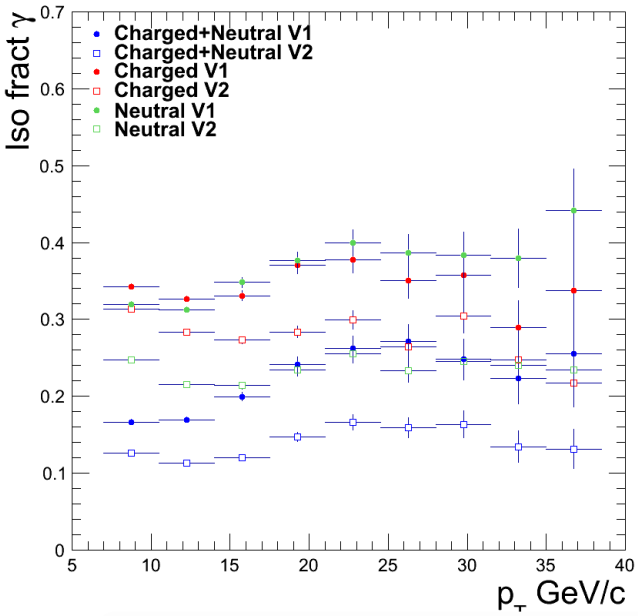
- The lower the fraction is, the purer the sample was (less contamination)
- Efficiency should be checked on MC

Setup

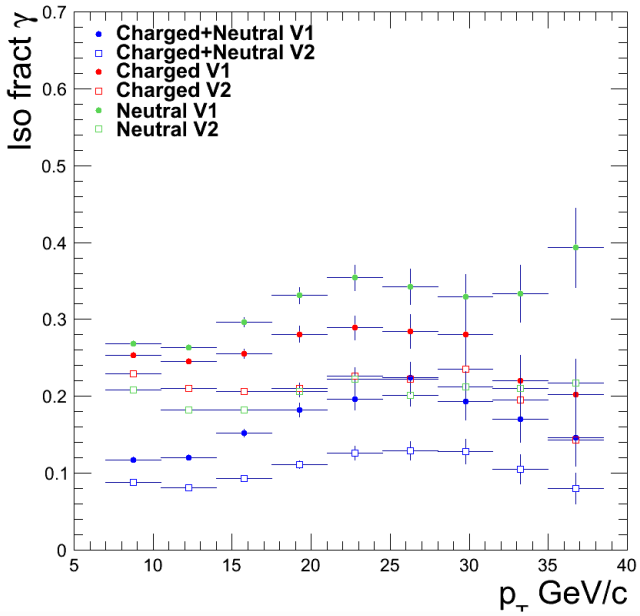
- LHC11d_pp7_pass1 without bad TPC runs ~106400 events (35 runs)
- Isolation cuts :
  - cone size = 0.4,0.3
  - threshold type = PtThresh<0.5 GeV, SumPtFrac<10%
- Clusterizers : V1 or V2

Isolated γ / all vs. p_T

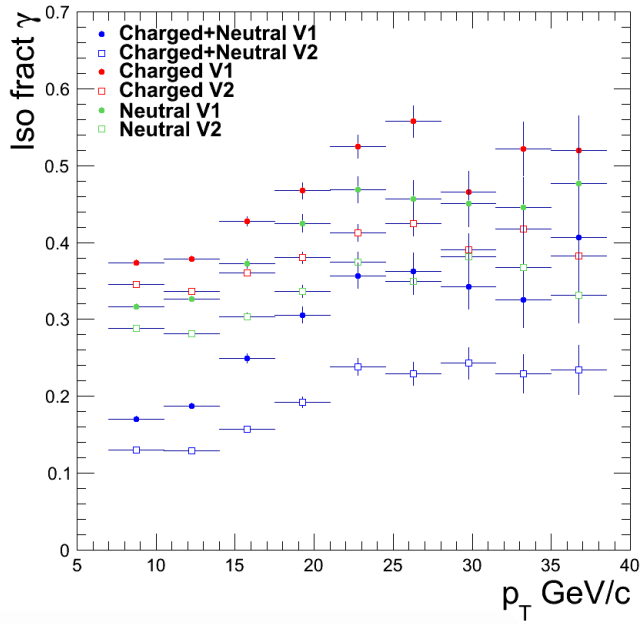
PtThres < 0.5
cone size $= 0.3$



PtThres < 0.5
cone size $= 0.4$



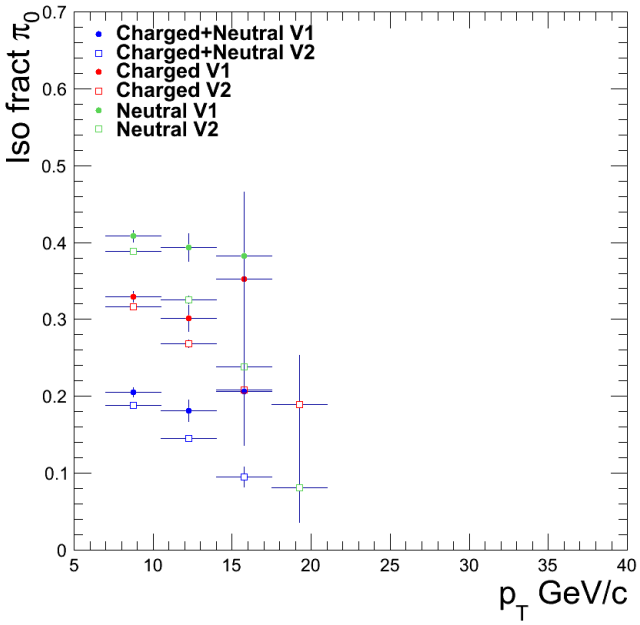
SumPtFrac $< 10\%$
cone size $= 0.4$



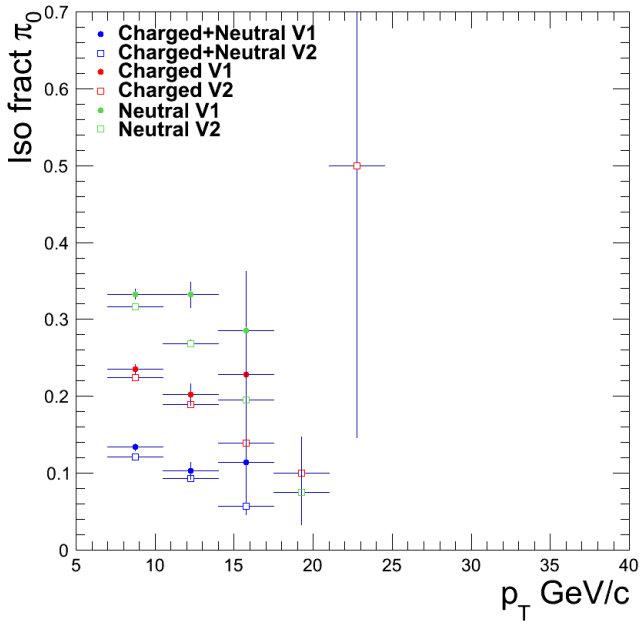
- Using neutral and charged information in the isolation cone helps removing contamination
- Opening the cone reduces slightly the contamination
  $\Rightarrow$ check saturation effect above 0.4
- Increase above 10 GeV/c probably due to better removal of π^0
  $\Rightarrow$ check MC

Isolated π^0 / all vs. p_T

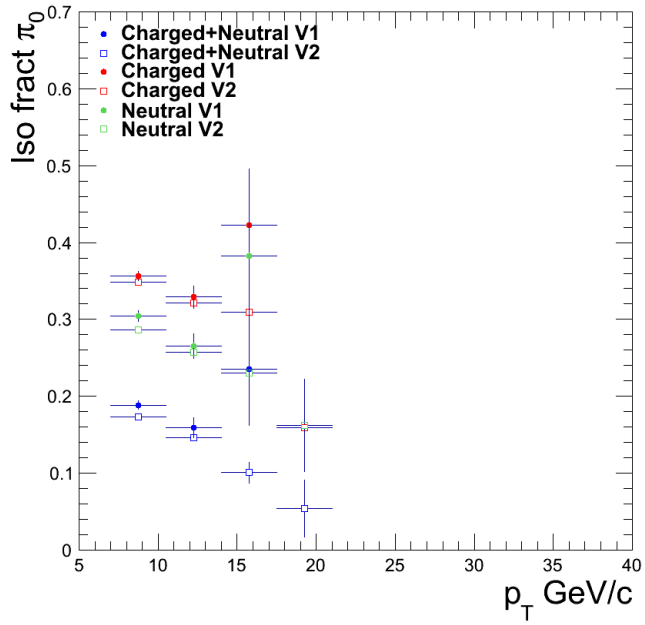
PtThres < 0.5
cone size $= 0.3$



PtThres < 0.5
cone size $= 0.4$



SumPtFrac $< 10\%$
cone size $= 0.4$

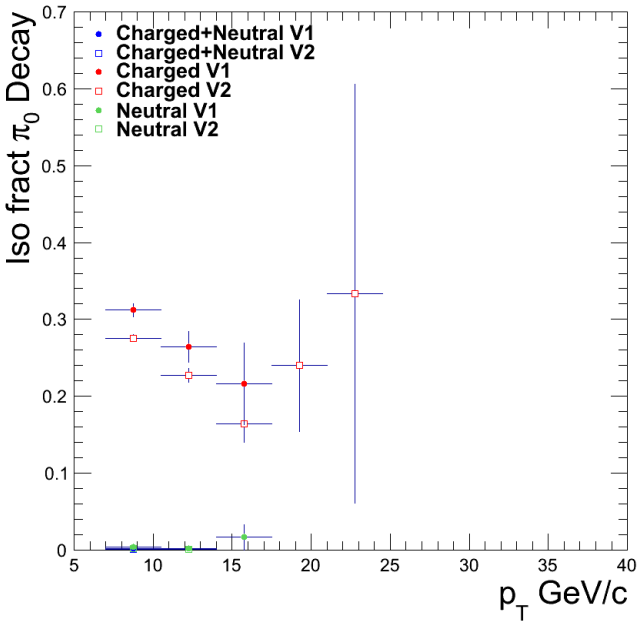


- γ from π^0 are removed : biasing slightly results when they are in the cone

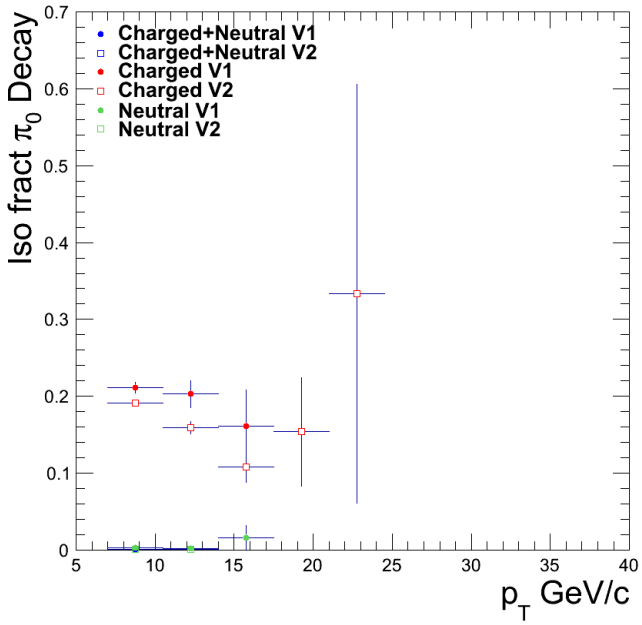
$\Rightarrow$ Check MC or embedding of MC in pp real events

Isolated decays / all vs. p_T

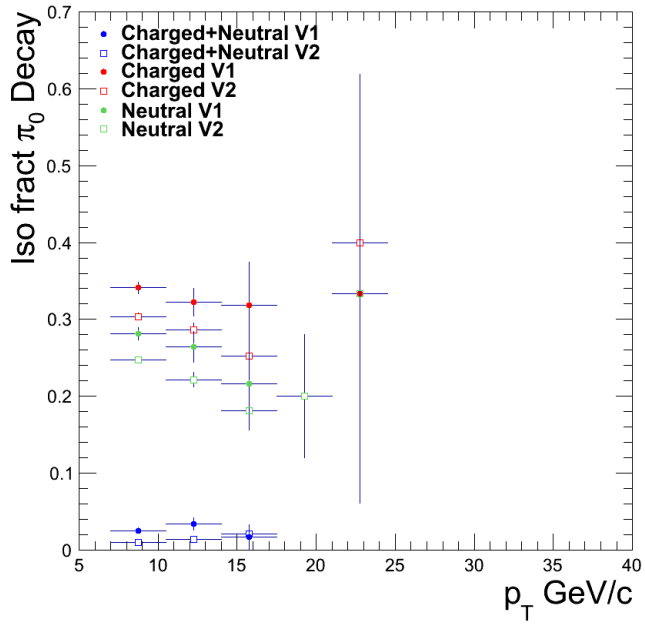
PtThres < 0.5
cone size $= 0.3$



PtThres < 0.5
cone size $= 0.4$



SumPtFrac $< 10\%$
cone size $= 0.4$



- Isolation fraction using charged information close between π^0 and decays

Summary

Conclusion

- Using charged **and** neutral information in the isolation cone gives a purer sample

$\Rightarrow$ Need MC to validate this

Todo

- Vary systematically
  - Isolation methods *(try also SumPtThresIC)*
  - Thresholds
  - Cone sizes
  - Clusterizers
- Compute efficiencies for the same parameters once MC is available or using γ embedded in pp real events
- Look at PbPb once background subtraction is implemented