Checking MVD productions and usage

Dilepton meeting
GSI, Germany
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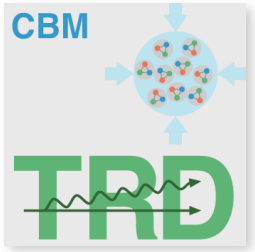


What is checked?

Common productions

- /lustre/cbm/users/isegal/mc/cbmsim/apr20_fr_18.2.1_fs_jun19p1/urqmd_pluto_w/auau/12agev/centr_0_10/sis100_electron_target_25_mkm/TGeant4/
- /lustre/cbm/users/isegal/mc/cbmsim/apr20_fr_18.2.1_fs_jun19p1/urqmd_pluto_inmed_had_epem_12gev/auau/12agev/centr_0_10/sis100_electron_target_25_mkm_no_mvd/TGeant4/

Analysis was done with the PaPa framework

Simulation properties can be checked at:

- https://docs.google.com/spreadsheets/d/1JjWtDWYRN14zr6xK5jMiTRSeFoSf2lO3APliogg4qpo/edit#gid=111194980

Cut class information

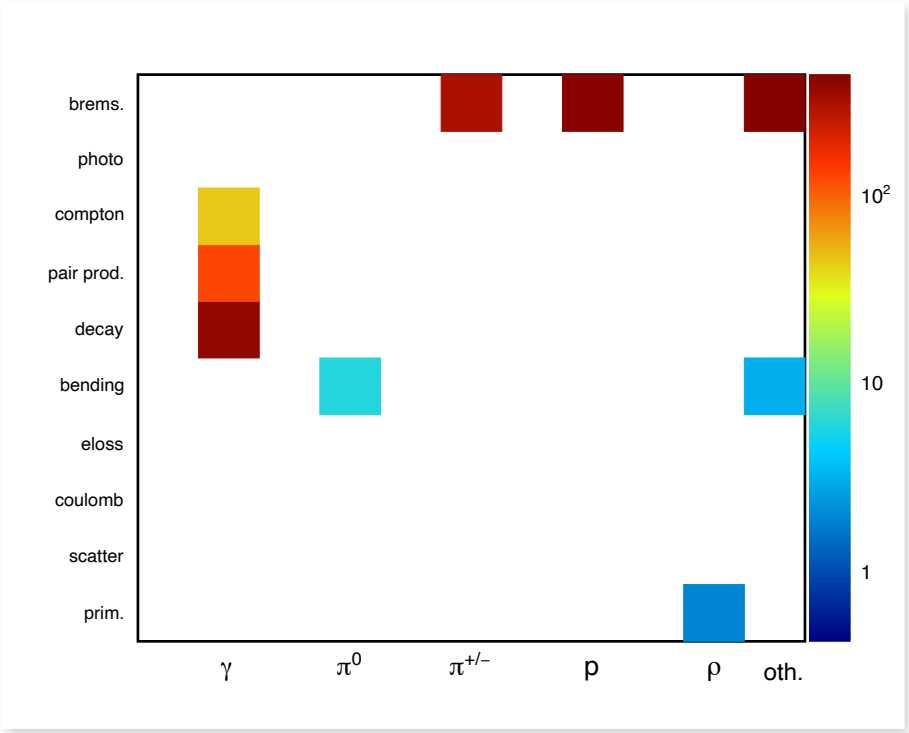
	ACC	REC	FULL
MC STS hits	> 0	> 0	> 0
MC RICH hits	> 0	> 0	> 0
MC TRD hits	> 0	> 0	> 0
STS hits		> 2	> 2
χ^2/NDF		< 3	< 3
RICH hits		> 5	> 5
TRD hits		> 2	> 2
RICH eID			90 %
TRD eID			80 %

Electron production - MC tracks

These are all produced electrons, together with their respective production mechanism as marked by GEANT

The x axis shows the mother particle

The very last column are all other particles



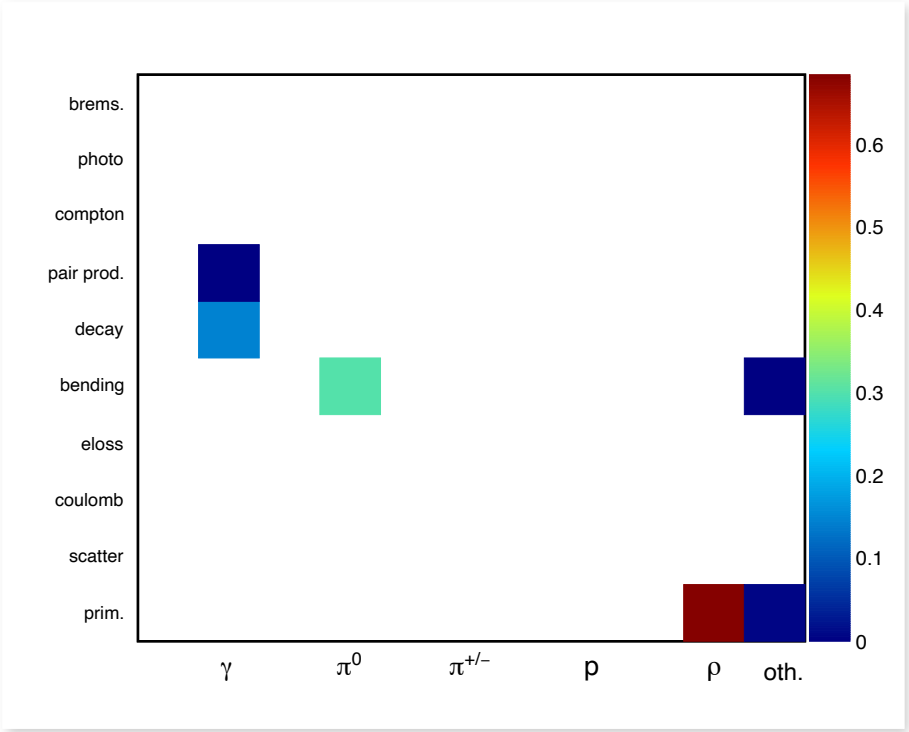
P.S. If anybody knows to which mechanism "kPMagneticFieldL" (bending in magnetic field) is refering, please inform us

Electron production - tracks in reconstruction cuts

The total electron load reduces drastically with regular reconstruction cuts:

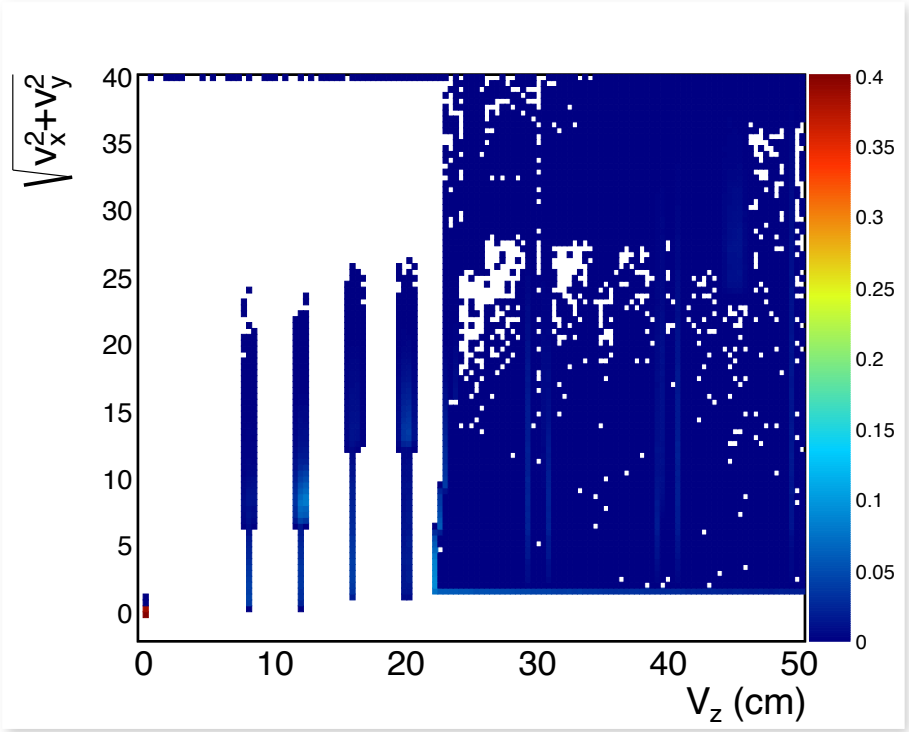
- **> 2 STS hits**
- **> 5 RICH hits**
- **> 2 TRD hits**
- **< 3 chi^2/NDF**

I am currently looking into the electrons from π^0 but I don't want to be to hasty with the results



Primary vertex of conversions - MC tracks

The MC tracks show that most conversions are produced in the target but additionalcome from the detector material

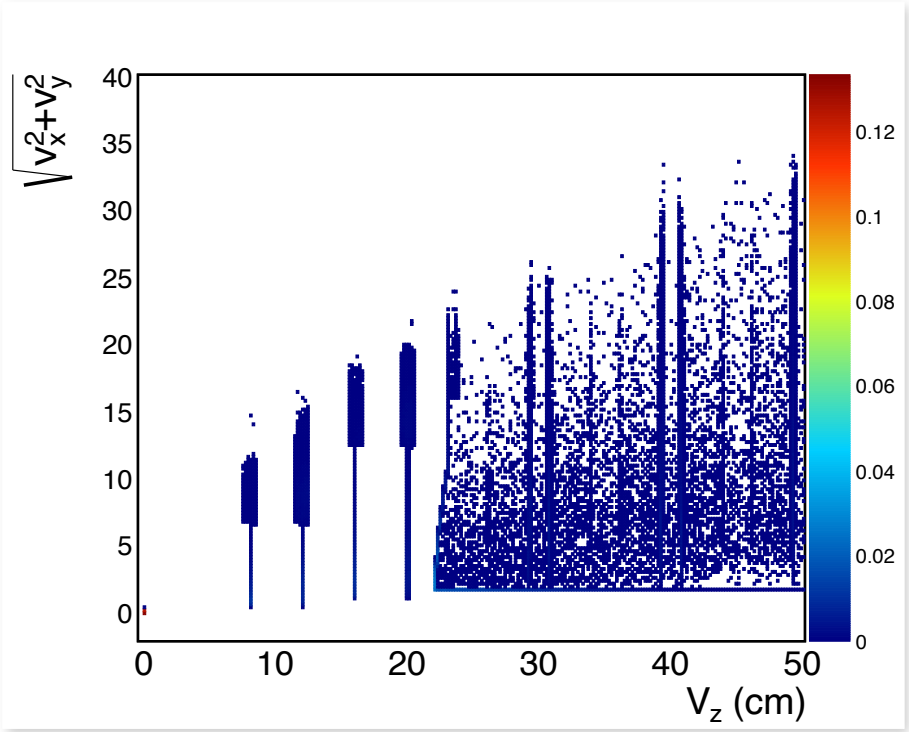


Primary vertex of conversions - ACC cuts

If I apply:

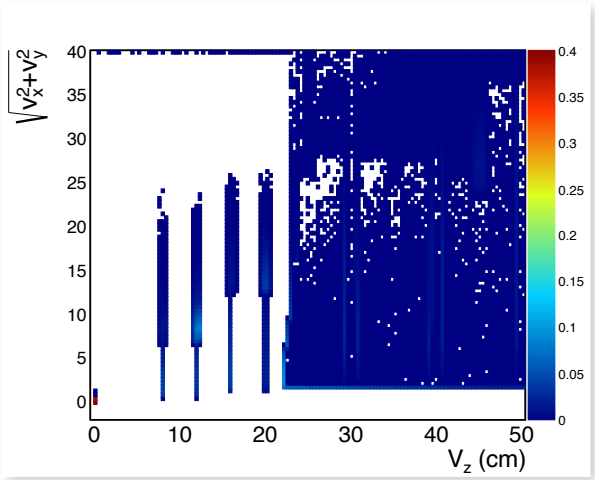
- **> 0 MC STS hits**
- **> 0 MC RICH hits**
- **> 0 MC TRD hits**

The remaining conversions reduce drastically

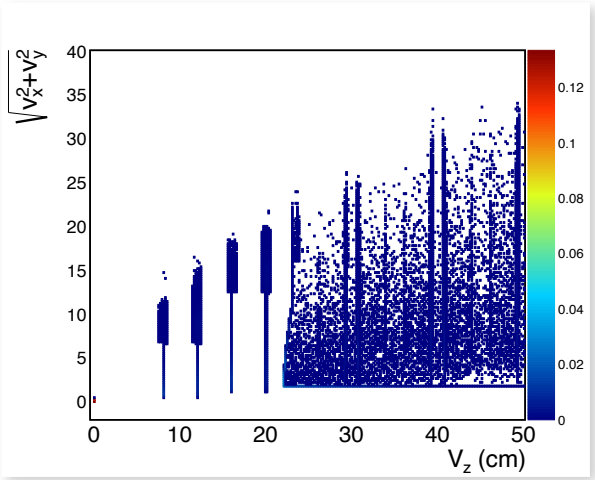


Primary vertex of conversions

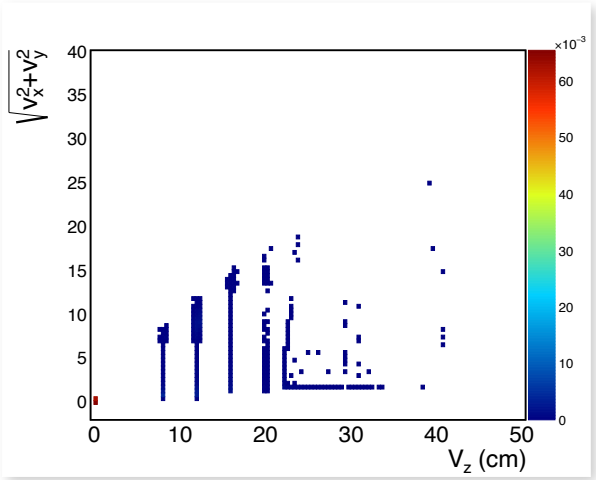
MC



ACC



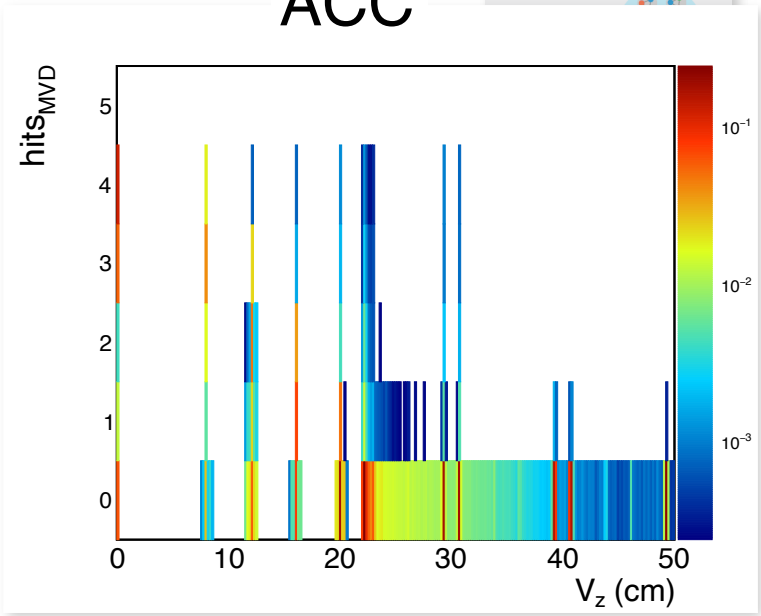
REC

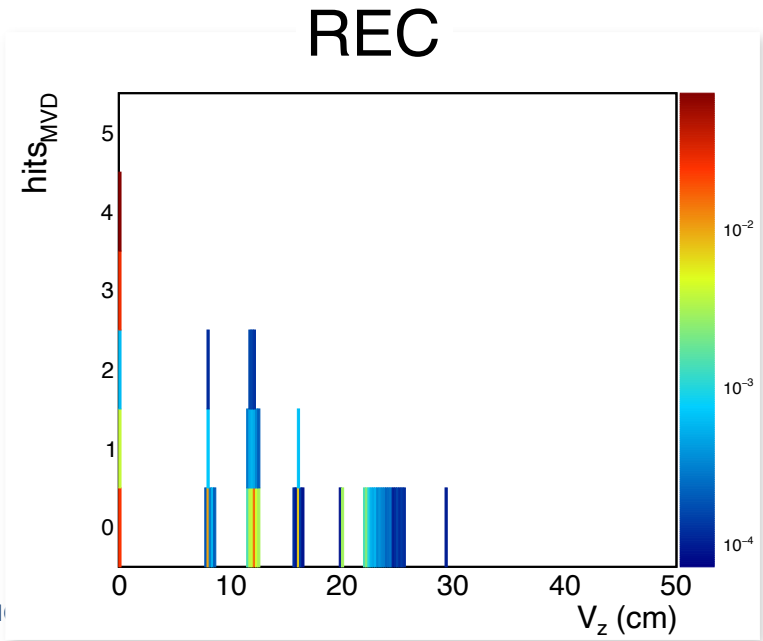


With all regular reconstruction cuts there are a few conversions left that could be rejected via usage of the MVD

MVD hits

Here we see that there could potentially be the opportunity for some rejections with the usage of the MVD



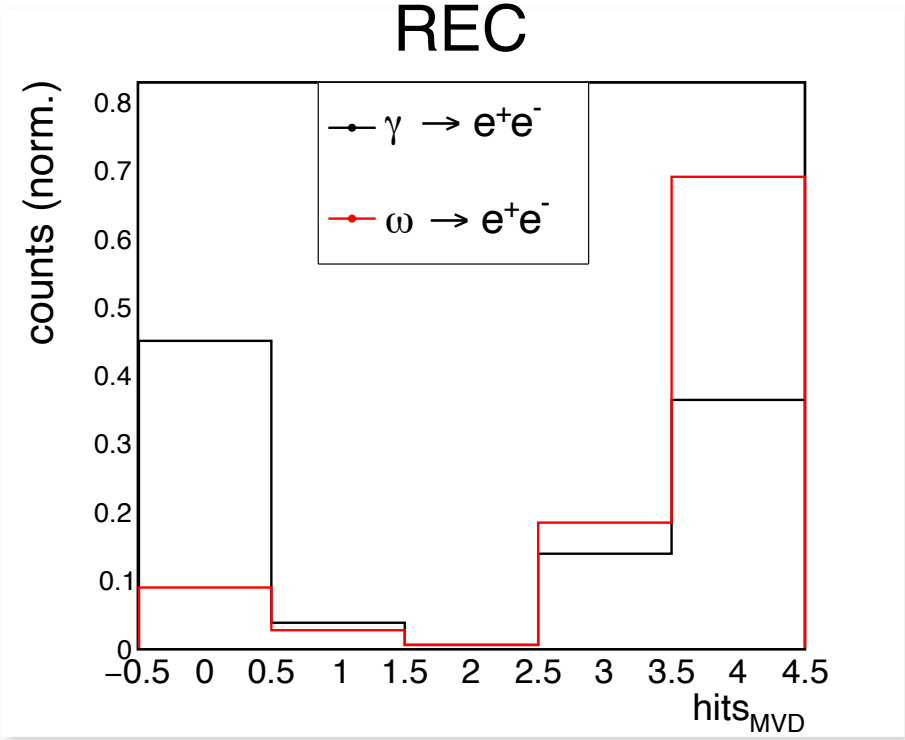


Usage of the MVD - first look

We would assume that the particles, coming from the target, are seen in the MVD

Therefore, I apply:

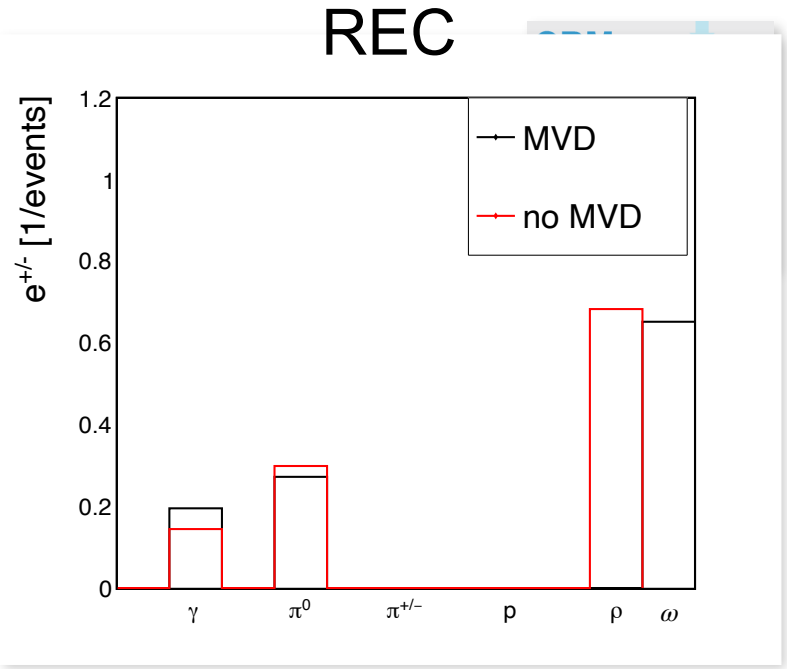
> 2 MVD hits

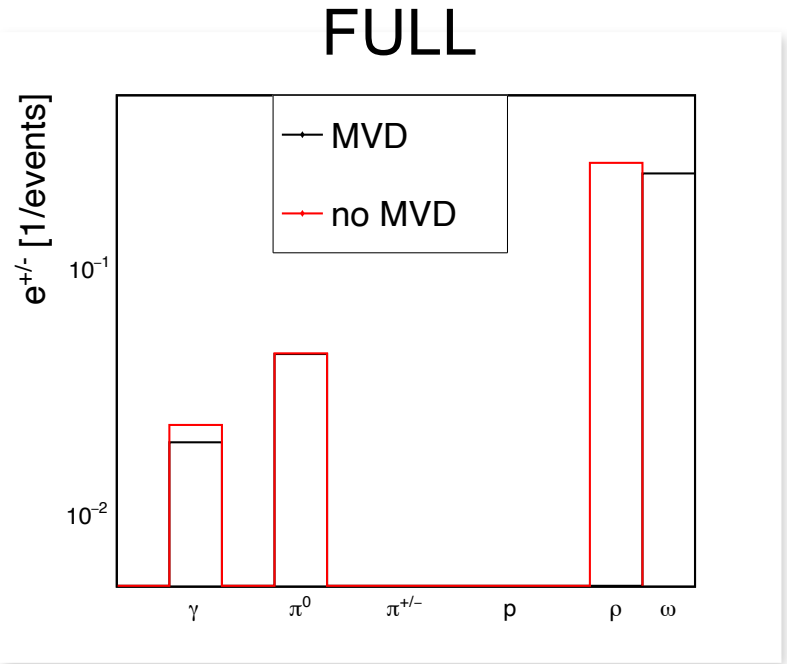


Comparison of the productions

MVD introduces some additional gamma conversions

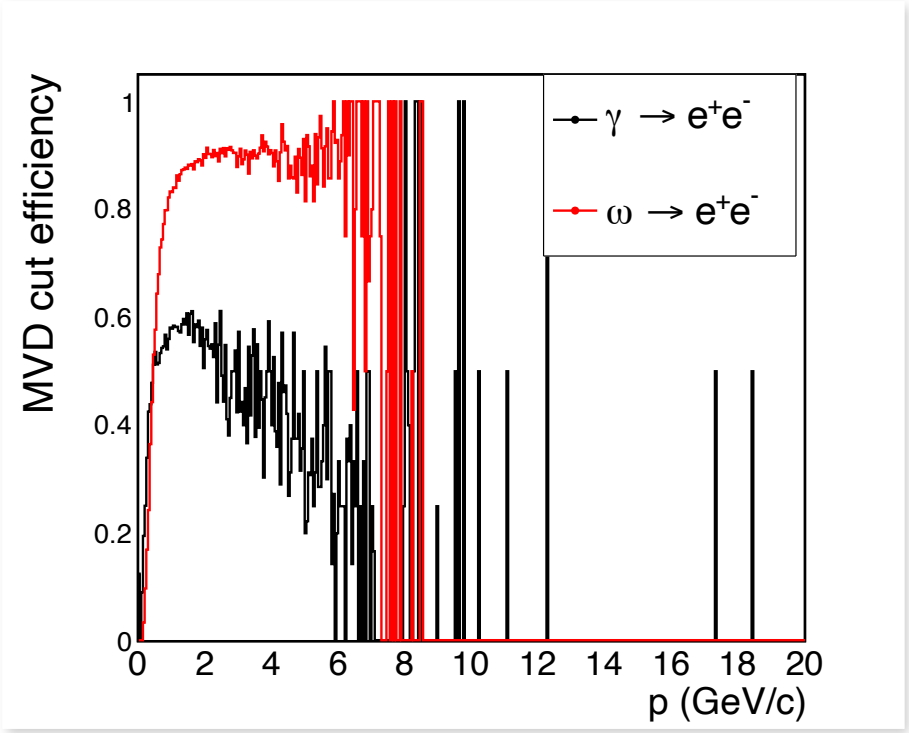
However, the total $\gamma \rightarrow e^+e^-$ contribution can be reduced in the final stack



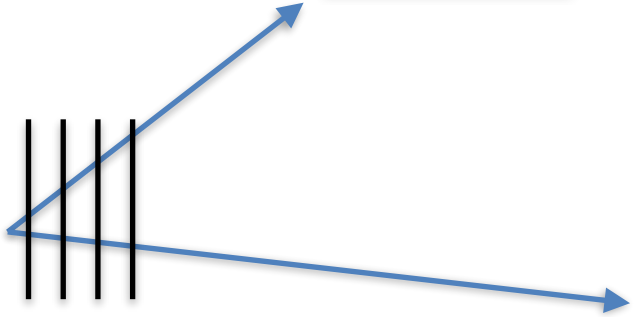


Usage of the MVD - first look

This cut can drastically decrease the contributions of gamma conversions at the cost of a bit of signal



Next steps



Use MVD for track filtering

-> reject both legs from the pairing procedure
(this could further reduce the background)

Use larger productions to quantify the impact of the MVD on the invariant mass spectra

Directly compare physics observables in productions with and without the MVD