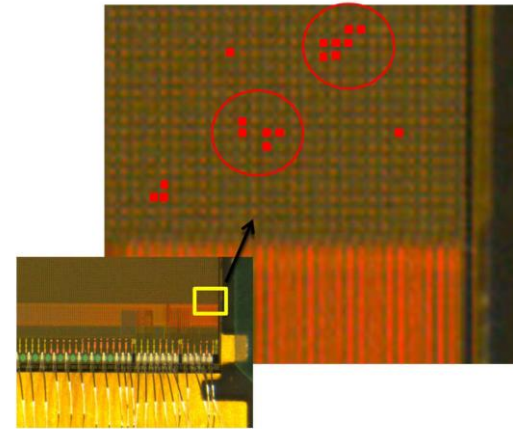
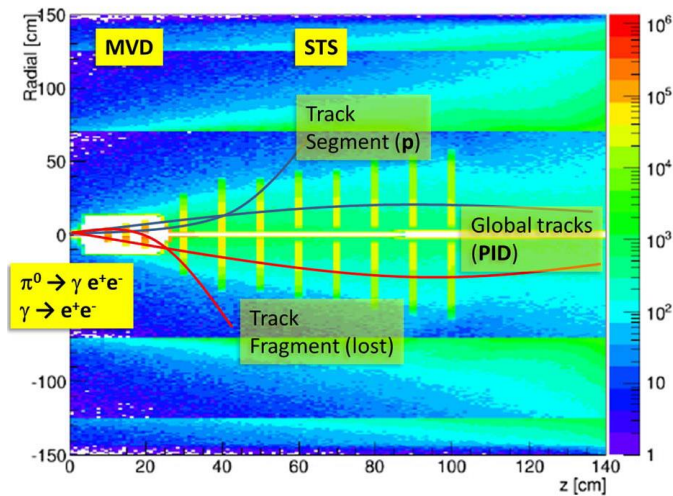


Employing the CBM Micro Vertex Detector for Background Rejection in Dilepton Analyses

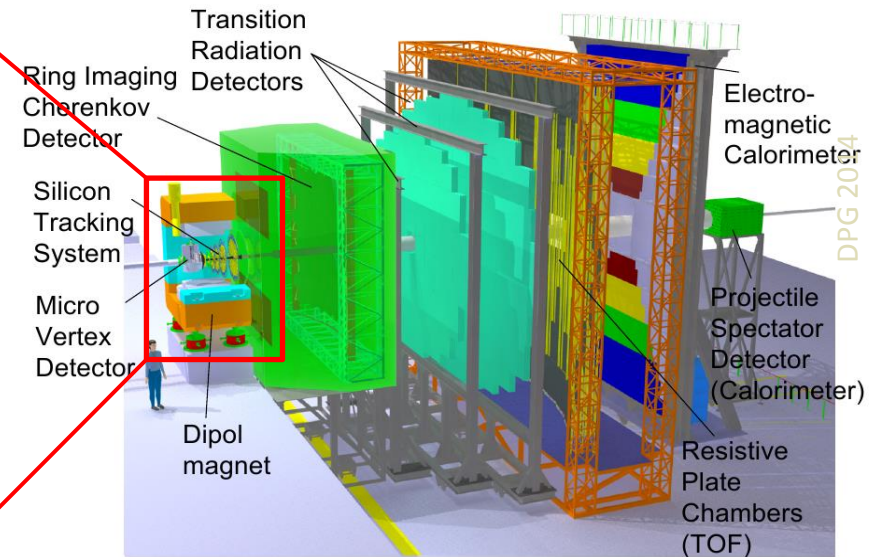
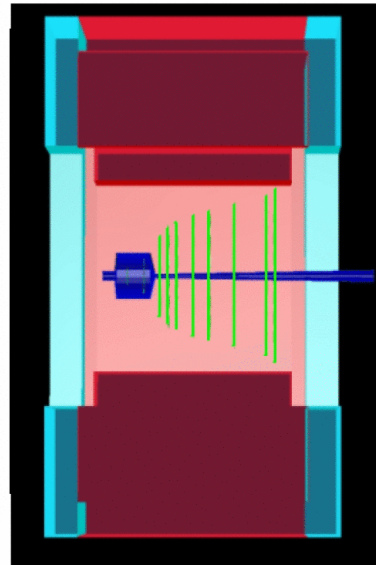
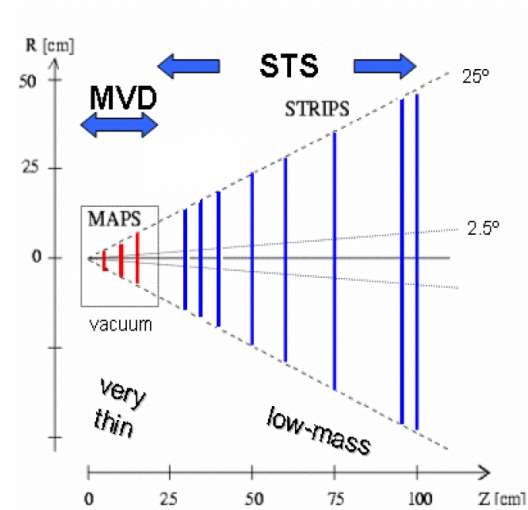
Erik Krebs

Outline

- Motivation
- Hit Topology Cut
- Tracking with the MVD



CBM Detector



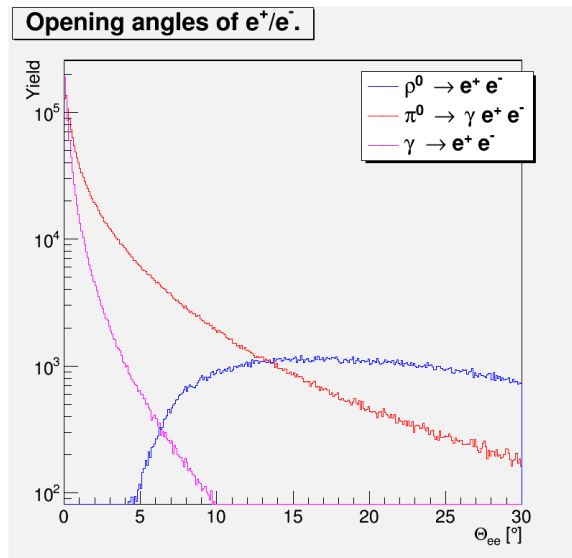
Motivation

- Dilepton spectroscopy allows to access the physics taking place in a heavy ion collisions.
- Challenges:
 - Low branching ratios:

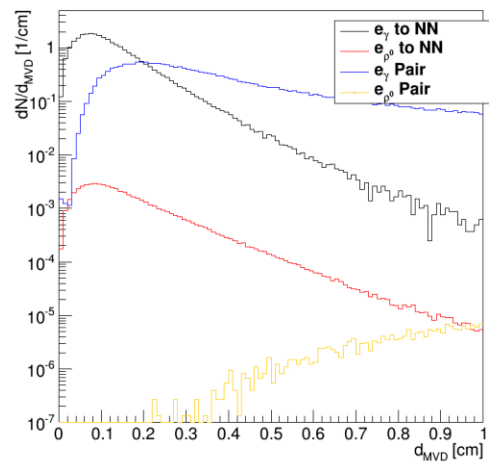
Particle	Decay Channel	Branching Ratio
ρ^0	e^+e^-	$4.7 \cdot 10^{-5}$
ω	e^+e^-	$7.3 \cdot 10^{-5}$
ω	$\pi^0 e^+e^-$	$7.7 \cdot 10^{-4}$
ϕ	e^+e^-	$3.0 \cdot 10^{-4}$

- Large background from γ -conversions and π^0 -Dalitz decays.
- Can the MVD contribute to reduce the background?

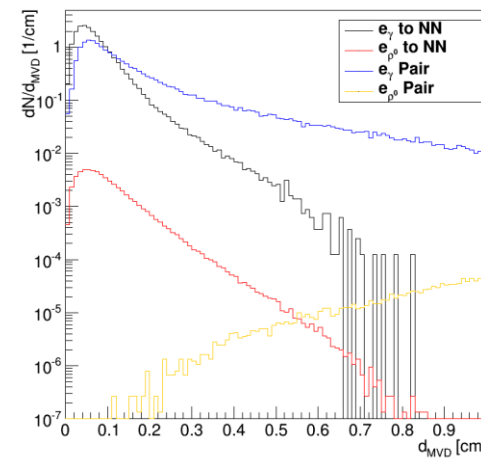
Hit Topology Cut



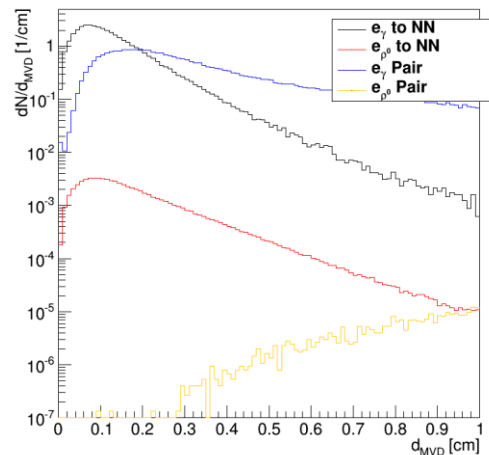
- Conversion pairs mostly have a small opening angle.
- Assumption: One track of a pair identified, the other one was not reconstructed, but has hits in the MVD.
- Compare distance to closest hit in the first MVD station that does not belong to a reconstructed track.



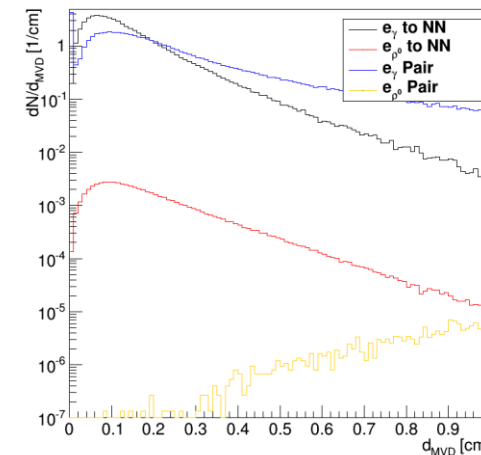
1st station at z=10cm, 100% field



1st station at z=5cm, 100% field



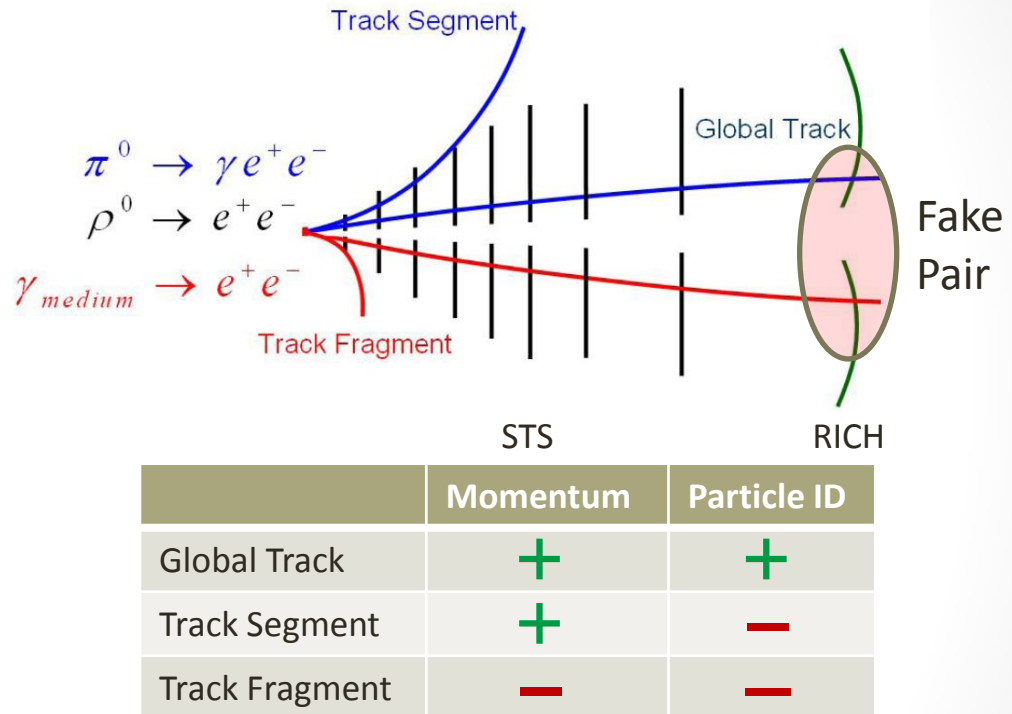
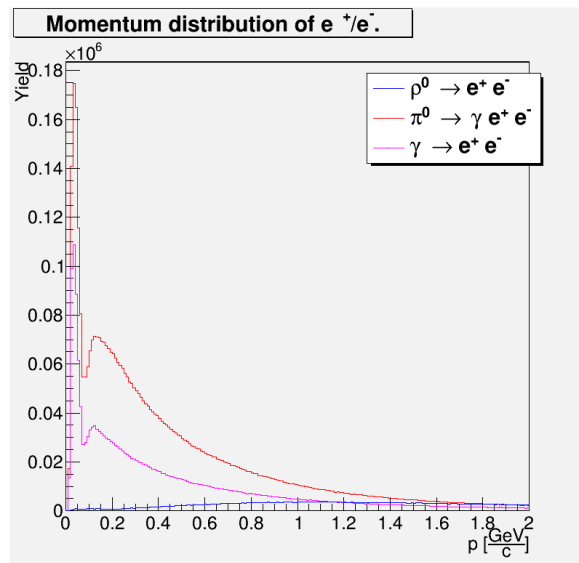
1st station at z=10cm, 70% field



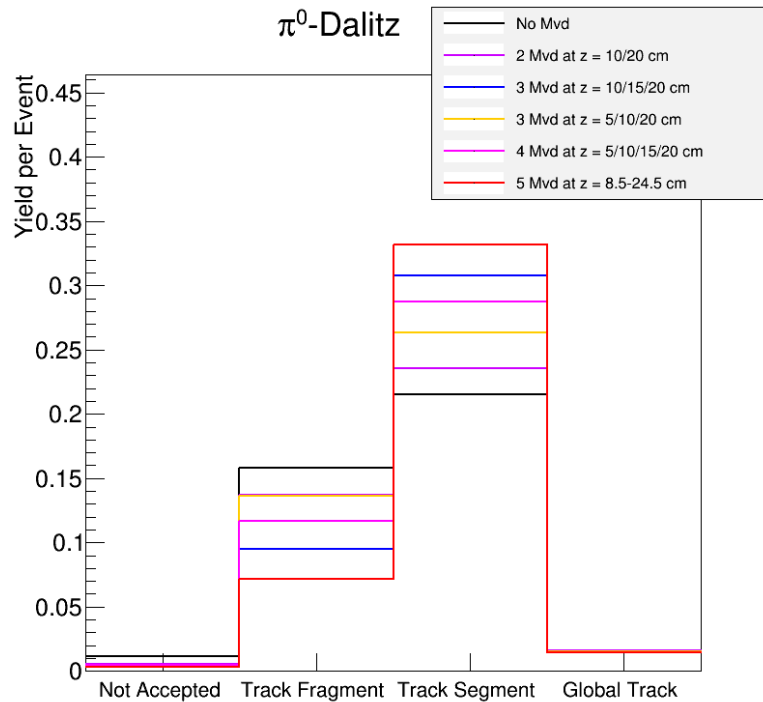
1st station at z=10cm, 30% field

- No separation between signal and background possible.

MVD as additional Tracking Stations

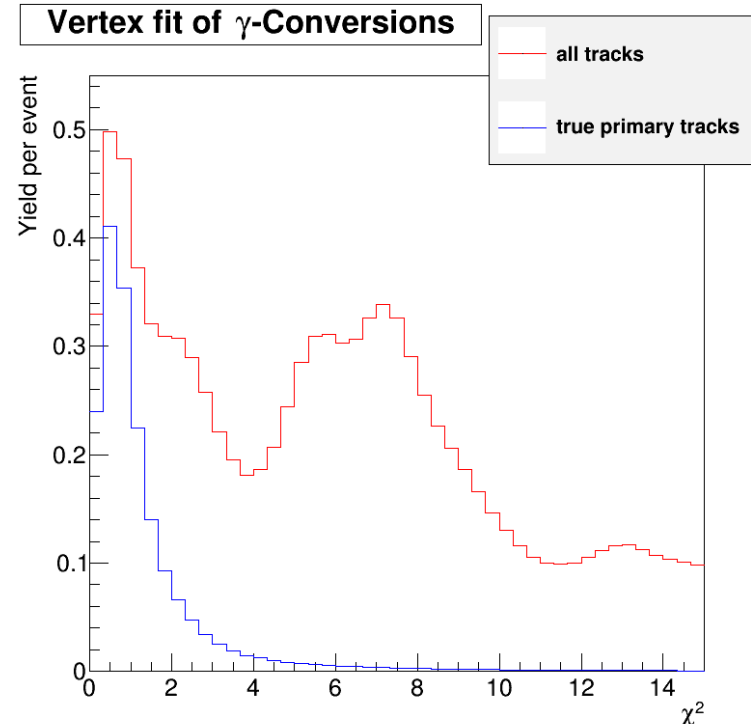
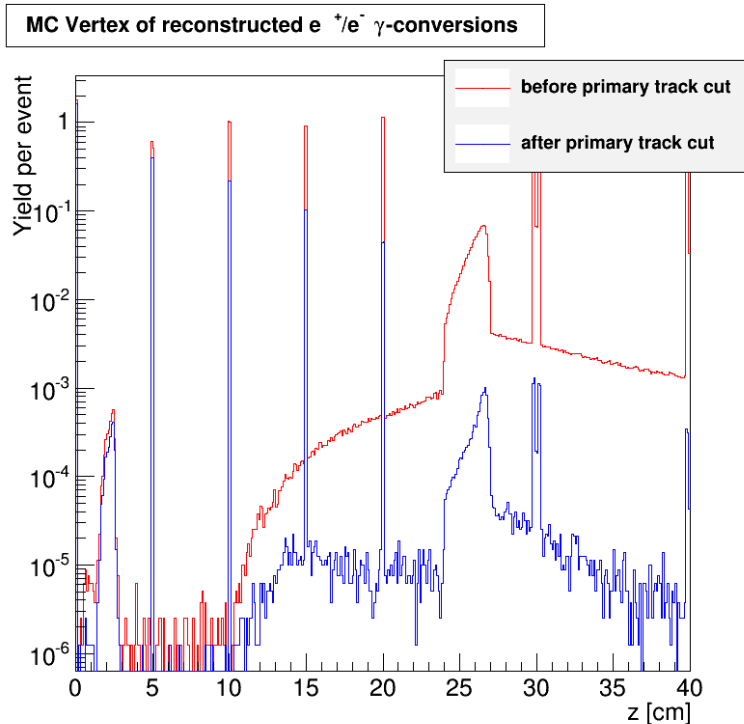


- Dielectrons from background sources generally have lower momenta than those coming from the signal.
- Include MVD in tracking to get more track segments out of track fragments.



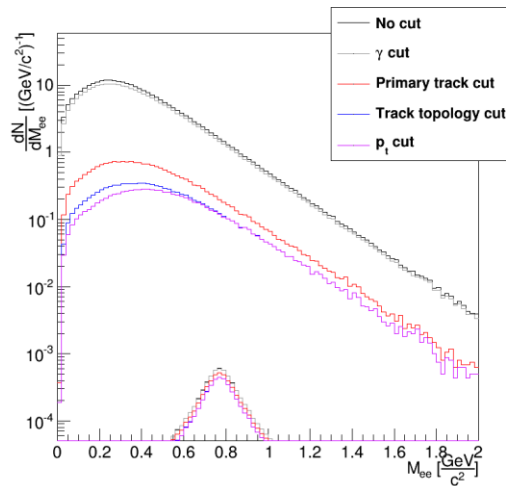
- Amount of reconstructed tracks increases with number of MVD stations.

γ -Conversions

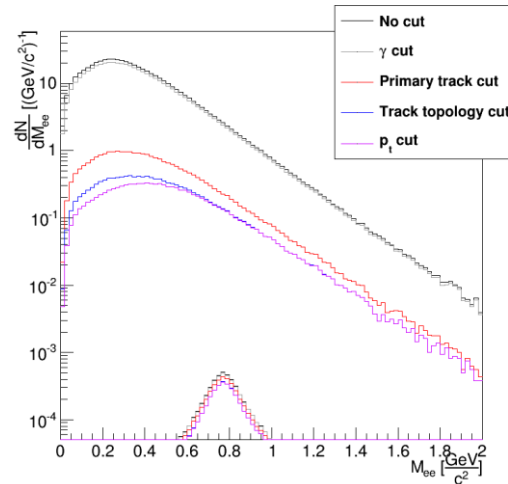


- Conversions in MVD misidentified as primary tracks
- χ^2 -cut alone not sufficient when including MVDs.

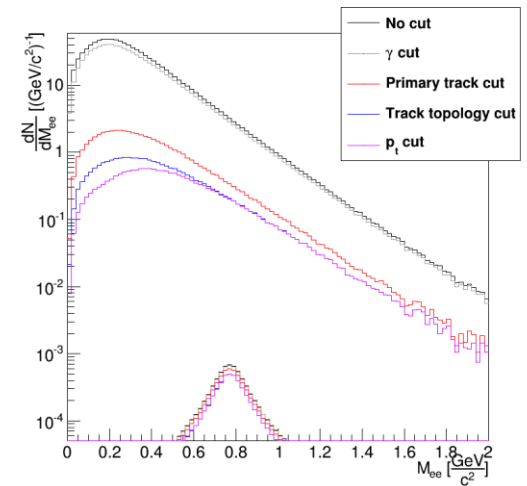
Invariant Mass Background



No MVD, 100% Field



3 MVD Stations, 100% Field



3 MVD Stations, 70% Field

- Cut values not optimized.
- More reconstructed tracks with MVD
- But more background all together.

Summary

- Hit topology cut not suitable for background rejection.
- More reconstructed tracks with MVD.
- But: Need to reduce additional background with refined primary track cut.
- Effects of delta electrons need to be taken into account.