

- Data are from  $pp \rightarrow pp\eta$  1.4 GeV from ~1500 Sep 2008 runs
- There are 3 possible approaches for publication of this data that I'm currently analyzing:
  - Single (Double) Dalitz of eta meson
  - Search for  $\eta \rightarrow e^+e^-$
  - Several leptonic decays of eta meson

## Ad 1) Single (Double) Dalitz.

To gather all people working on single Dalitz decay and/or double Dalitz decay (no matter if on pp or pd data) and to write a paper considering only this channel(s).

## Ad 2) Search for $\eta \rightarrow e^+e^-$

Prepare a paper on very rare  $\eta \rightarrow e^+e^-$  decay channel (with a part on single Dalitz used for normalization and study of electrons in CD) based on the data that I'm currently analyzing.

## Ad 3) Leptonic decays.

First approach is considering only so called “energy trigger” on the base of  $pp \rightarrow pp\eta$  1.4 GeV data. We may include also another trigger for charged particles used in this runs – TR30.

There is a possibility to combine results from several people in different experimental conditions (pp & pd).

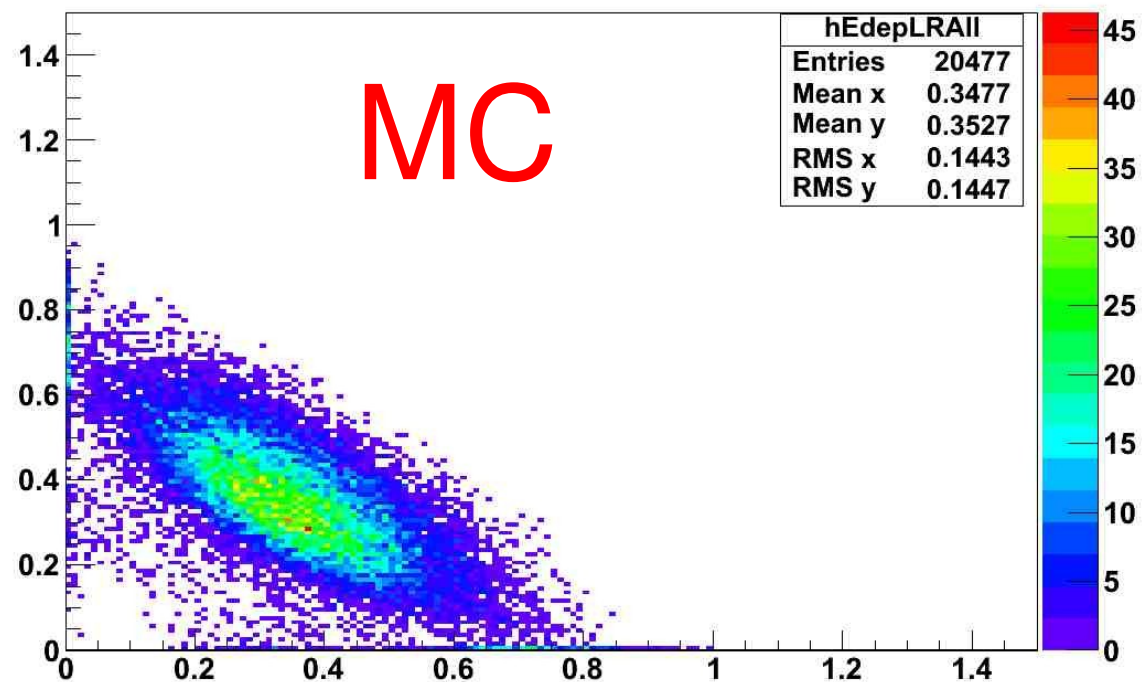
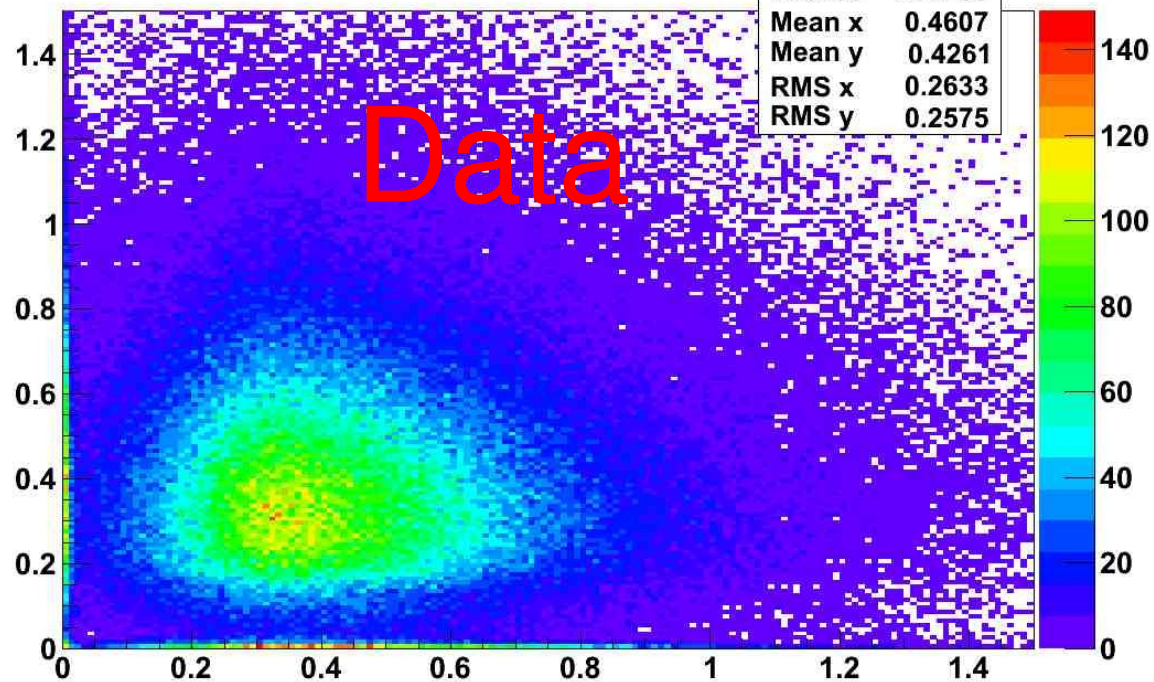
# Time line

- The time needed is a function of selected version of paper:
- Ad 1) Single (Double) Dalitz
  - coordination of effort of different people
  - from my side Single Dalitz analysis based on “energy trigger” almost completed ( $2 \times 10^4$  ev)
  - double Dalitz - just started (we see now  $\sim 100$  ev)

Could be completed until early Autumn

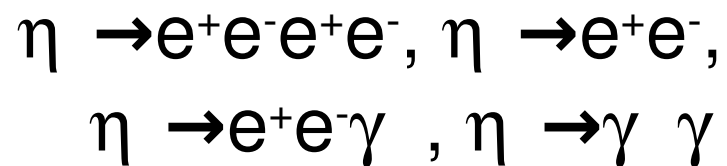
- TR30 only partly preselected (now  $\sim 10\%$ ), we see 4 times more event candidates but with larger background (needed??)

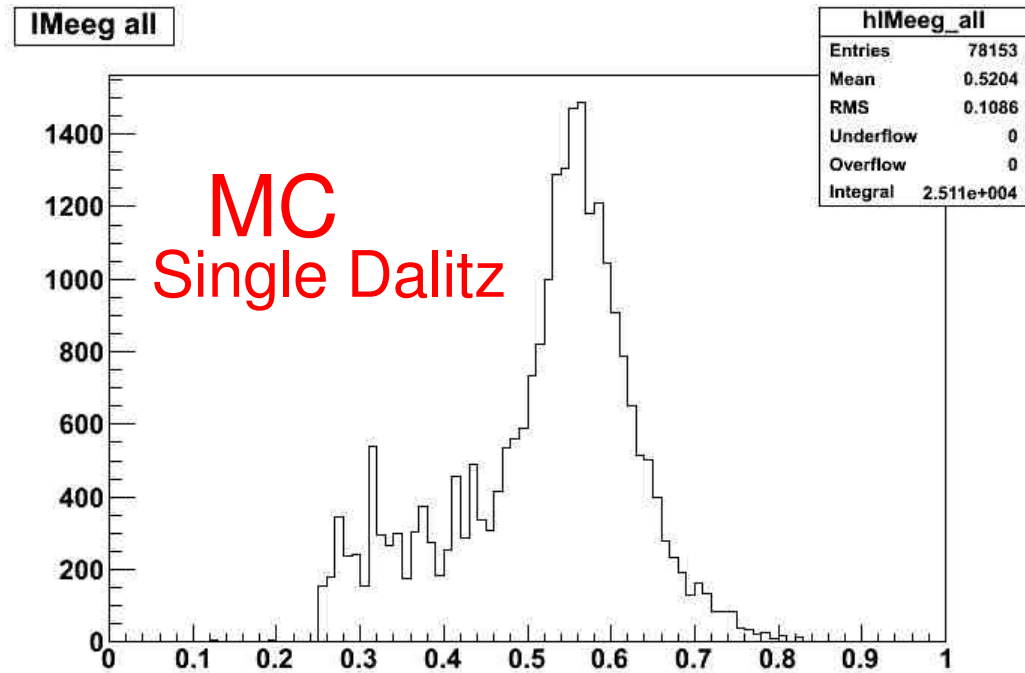
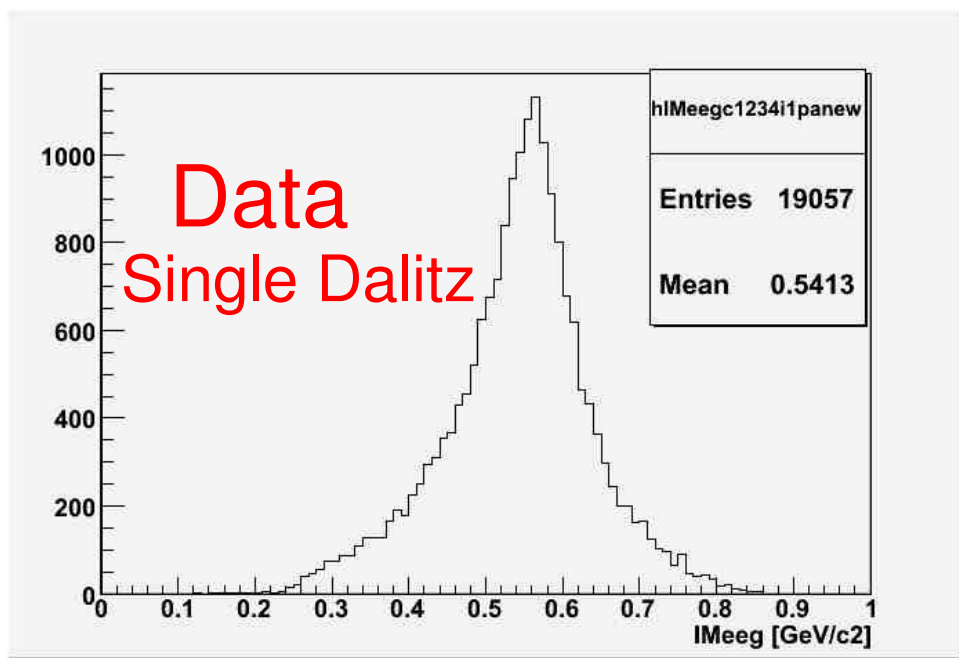
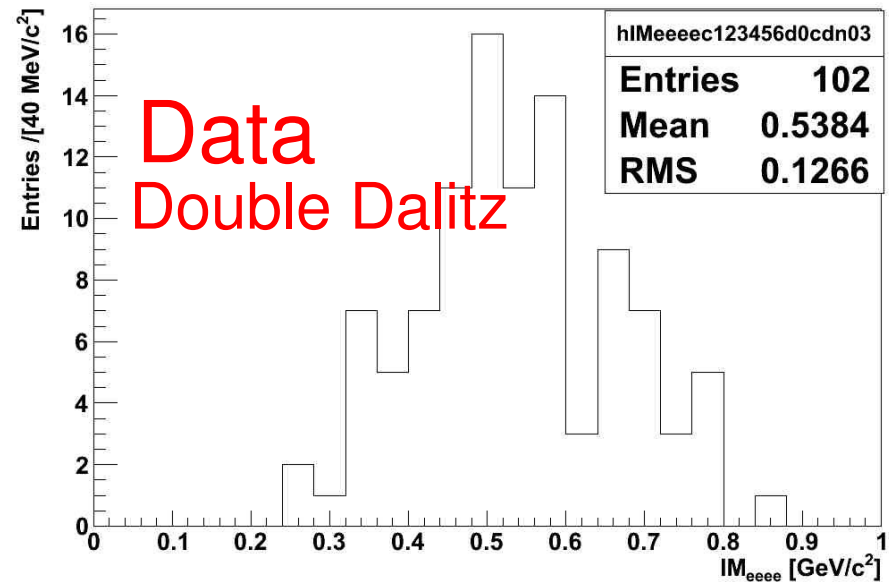
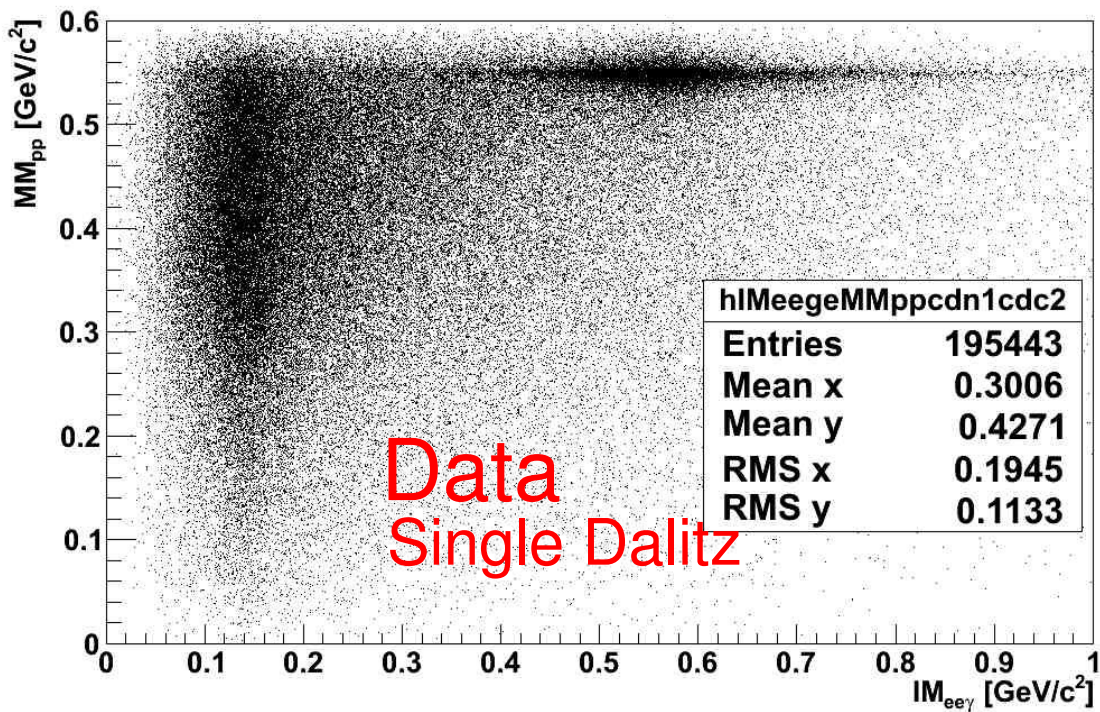
x-edepR, y-edepL CDC+CDN



# Energy trigger

- Trigger definition -  
[frha2\*frhb2\*ecrl\*Vfv  
h]
- High energy  
deposited in both  
sides of SEC
- It didn't choose  
between  $\eta$  decays:





# Time line

- Ad 2) Search for  $\eta \rightarrow e^+e^-$ 
  - Today upper limit  $2.7 \cdot 10^{-5}$
  - We need to significantly increase MC background for  $\eta \rightarrow e^+e^-$  (direct pion production, single Dalitz of eta, other channels) – only partially done (computing time  $\sim 1 \text{ day} / 10^6 \text{ ev}$ )
  - Further analysis of MC and data – few months
  - Time estimation to start of writing a paper - beginning of the next year



## The most important background

- Generated  $10^6$  events

$$\sigma(pp \rightarrow pp\pi^+\pi^-) \sim 1 \text{ mb} \quad (10^{-3} \mu\text{b}/\text{event})$$

$$\sigma(pp \rightarrow pp\eta) \sim 5 \mu\text{b}$$

- After condition 2fdc+2cdc+sign+reconstruction efficiency+geometrical acceptance – 162k ev
  - With cut  $MM_{pp}$  (0.52-0.58 GeV) – 13k ev
    - With cuts  $e_{dep}(e^+,e^-) > 0.3$  GeV – 5 ev
- Some additional kinematical cuts get rid of these events
- We prove that we are able to get rid of 2 pion background to the level of BR  $2 \cdot 10^{-4}$ 
  - Further increase (by factor 100) of MC statistic needed

# Edep cut

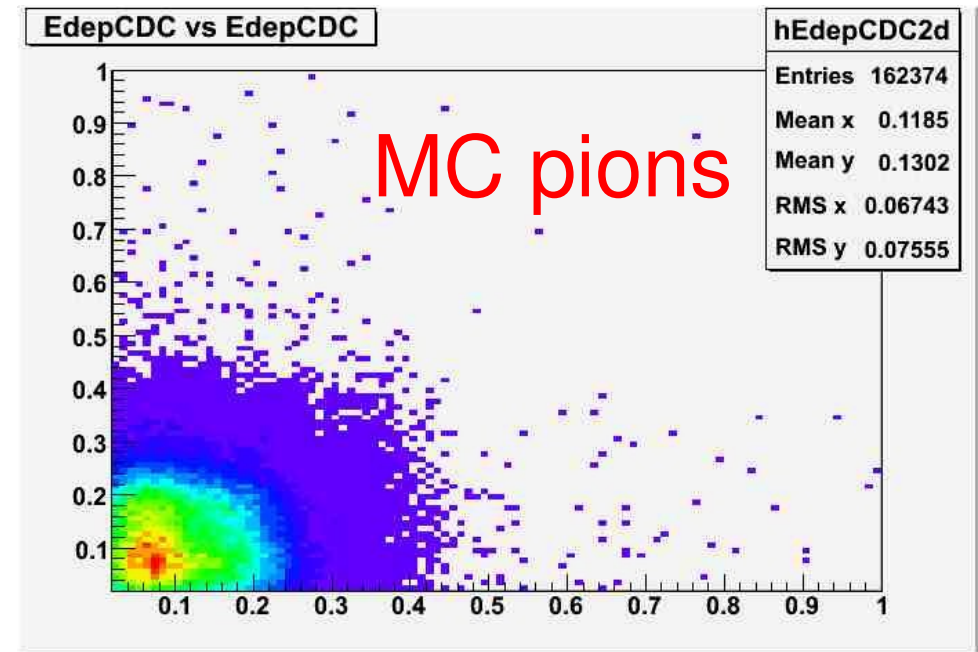
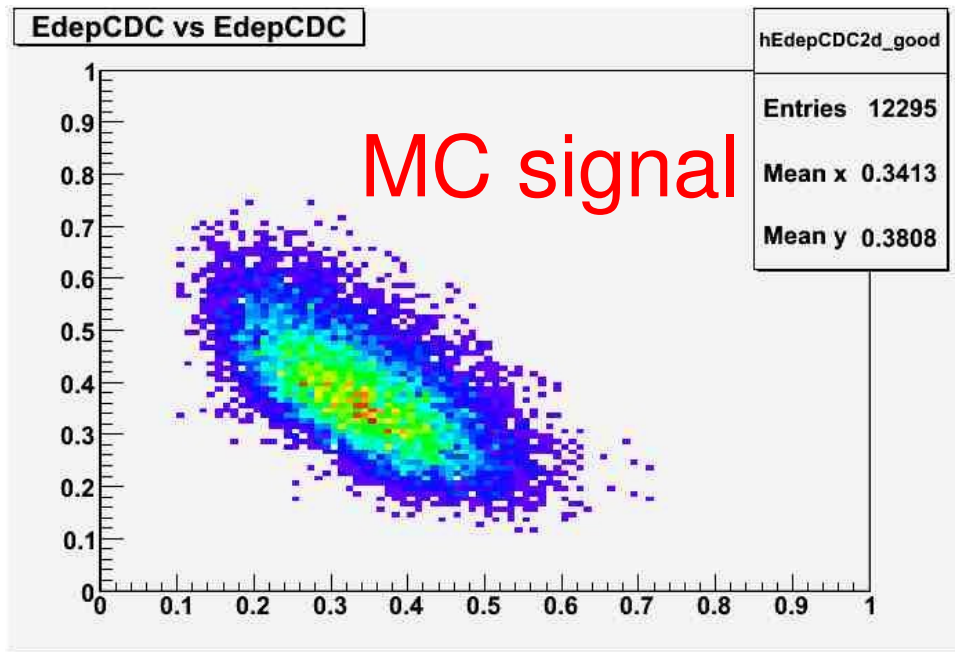


Illustration of validity of the cut on energy deposit in central detector for charged tracks

# Time line

- Ad 3) Leptonic decays
  - As for point 2) plus  $\sim 1$  months per each additional decay channel
  - Open question: Should we push  $\eta \rightarrow e^+e^-$  limit?

# Conclusion

- Main subject of my PhD thesis is  $\eta \rightarrow e^+e^-$  decay channel.
- I expect to finish analysis in one year from now.
- In a natural way I'm involved in analysis of several leptonic eta decay channels, considered as a background.
- Inclusion of my partial results to any paper on other particular leptonic channels is also possible.