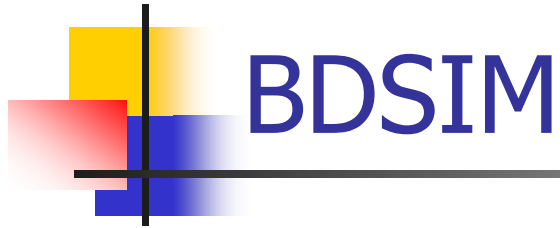


# ATF2 line studies with BDSIM using two different beam inputs parameters



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- Choice particle type (e-,e+, gamma)
- Choice energy, input parameters
- Sampler : "record" positions (after the selected element). Create one TTree each time (→ possibilities to see a Z dependence for example)
- BDSIM Options:
  - option,physicsList
    - hadronic\_standard
    - em\_muon
    - em\_standard
  - Options, beam characteristics (beam pipe radius )



# ATF2 V3.6 (Gaussian input)

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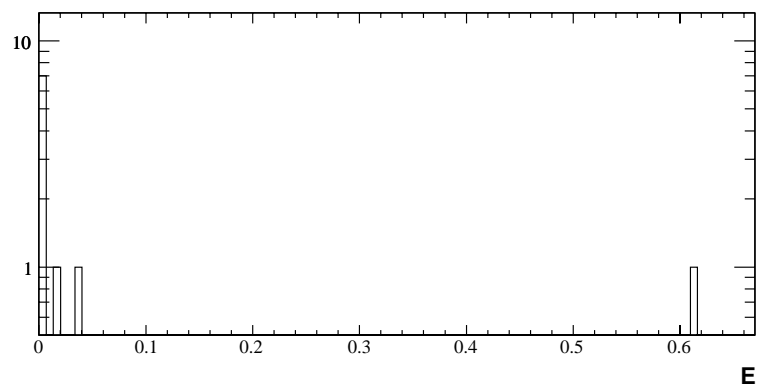
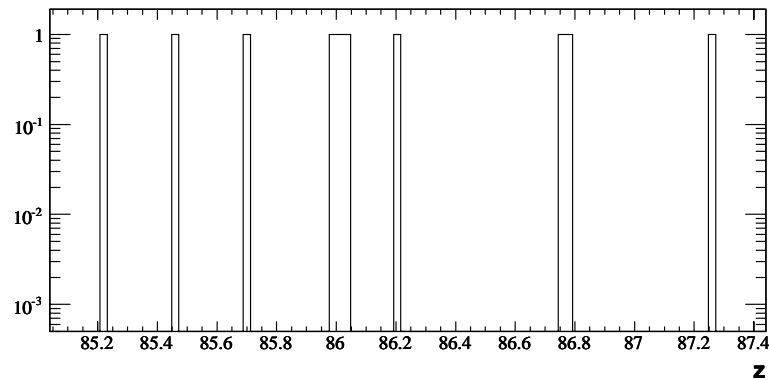
- $\sigma_x = 32.1 \cdot 10^{-5} \text{m}$
- $\sigma_y = 7.66 \cdot 10^{-7} \text{m}$
- $\sigma_{x'} = 1.64 \cdot 10^{-6}$
- $\sigma_{y'} = 8.99 \cdot 10^{-8}$
- $\sigma_E = 0.001 \text{ GeV}$



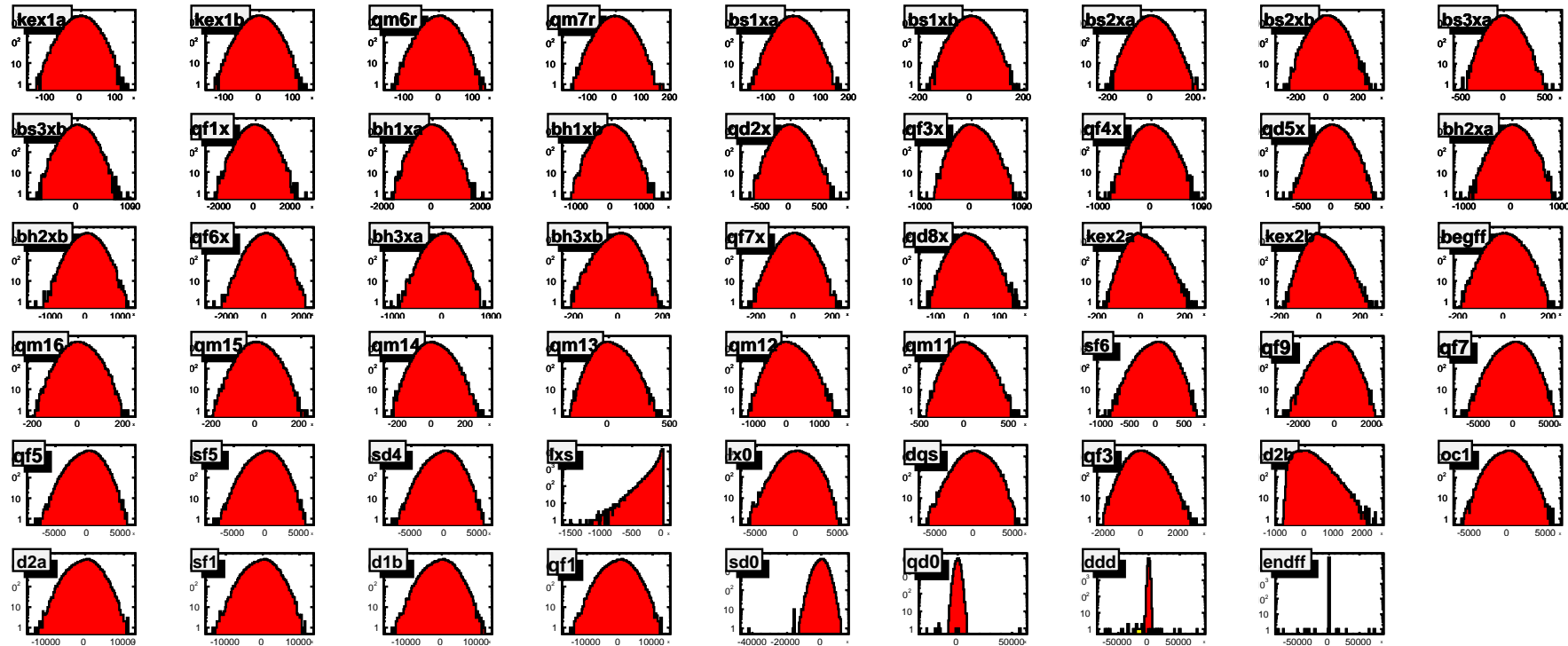
# Energy loss

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- No Energy loss
- No creation of secondary particles
- too perfect (?)
- Other option to switch on ?

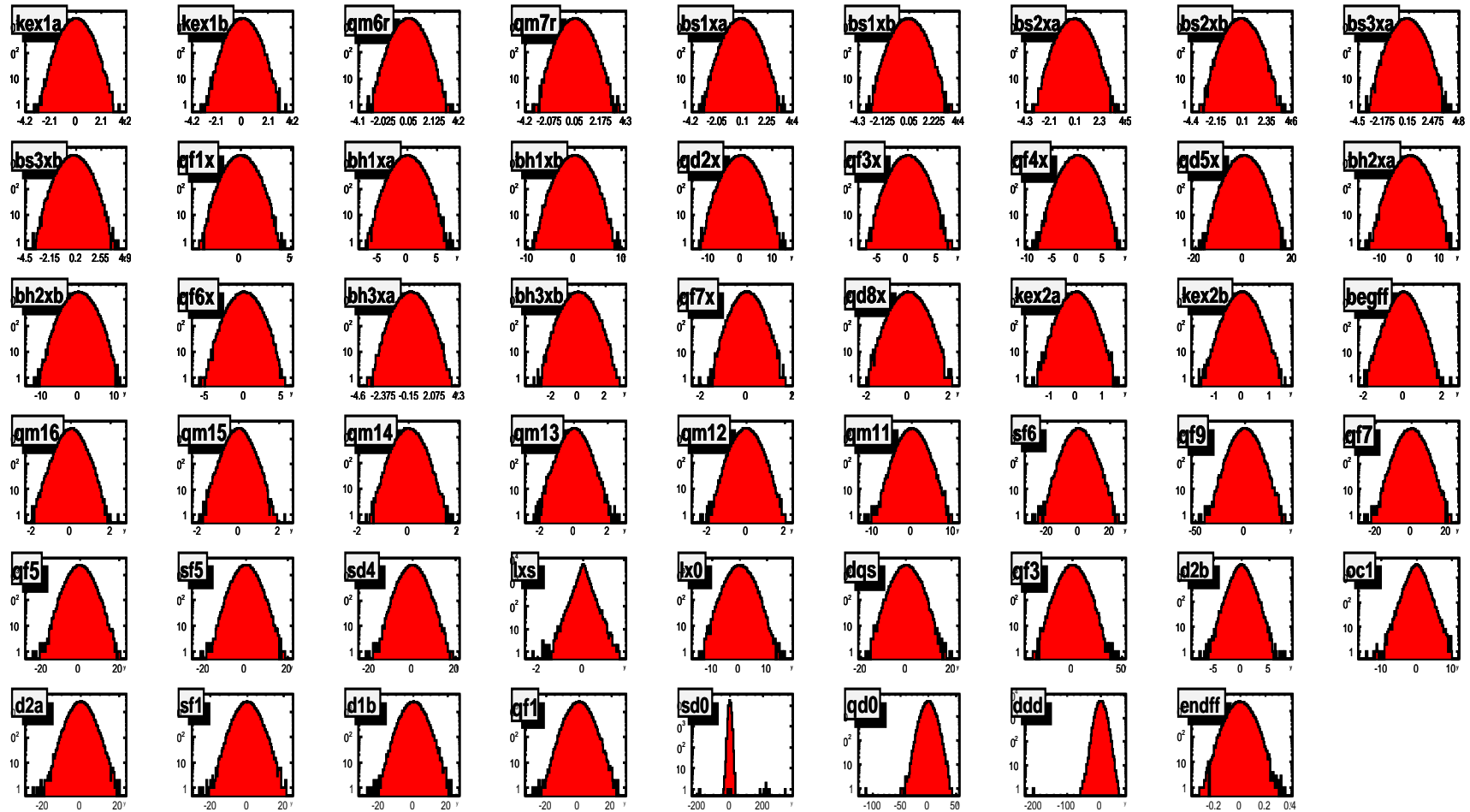


# Beam parameters (x)

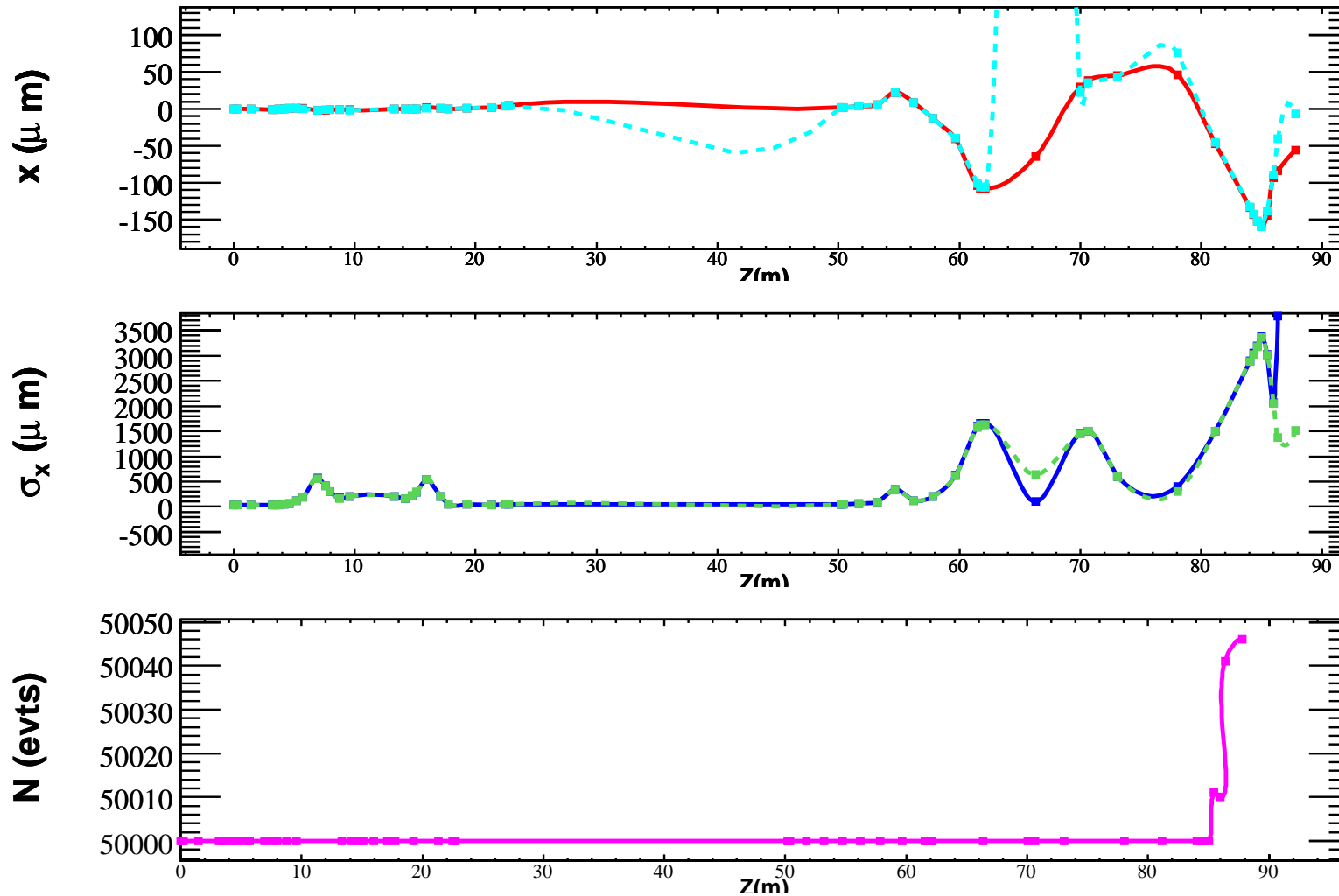


- One distribution after each element
- No secondary particles (... !)

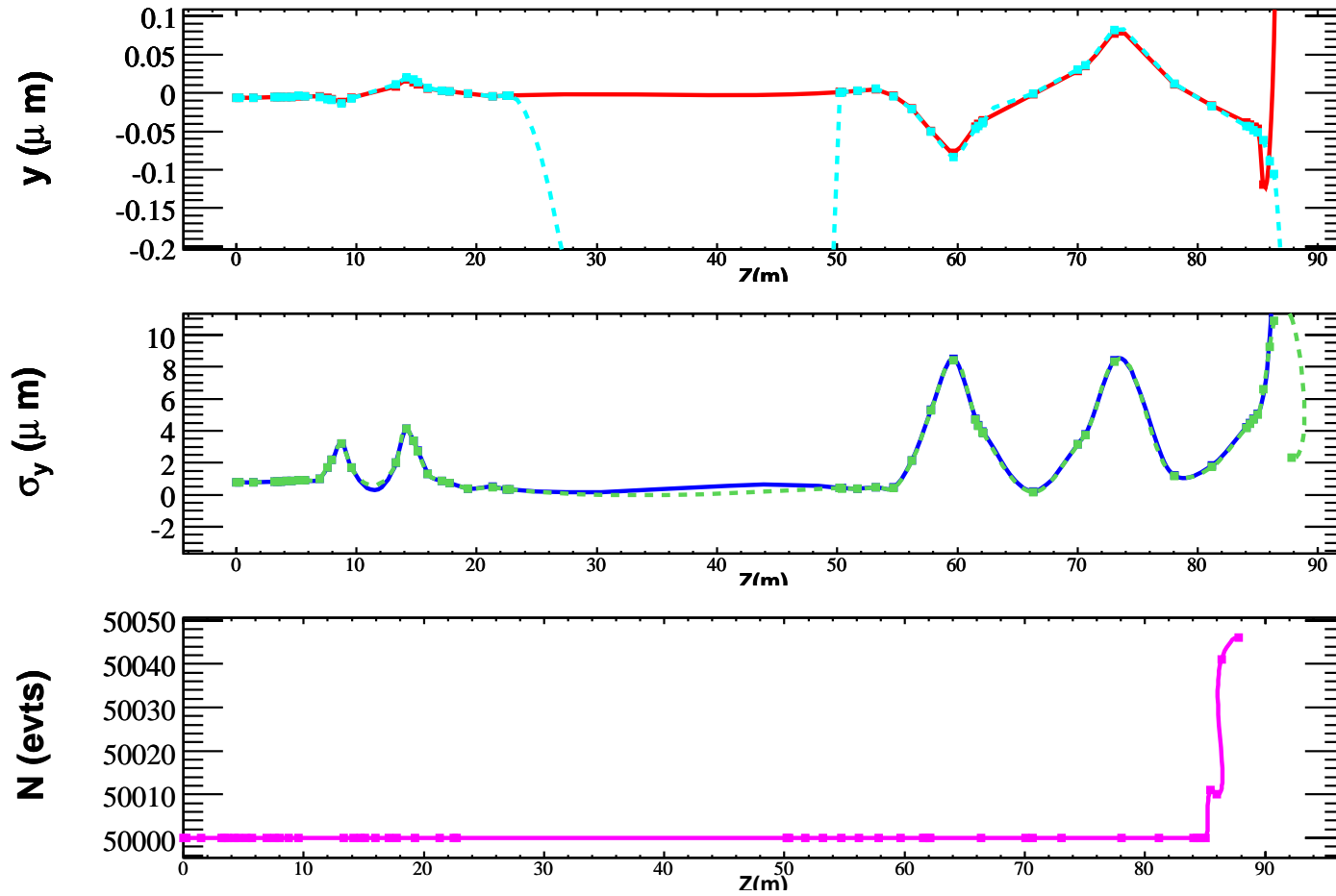
# Beam Parameters ( $\gamma$ )



# Beam parameter as a function of Z



# Beam parameter as a function of Z





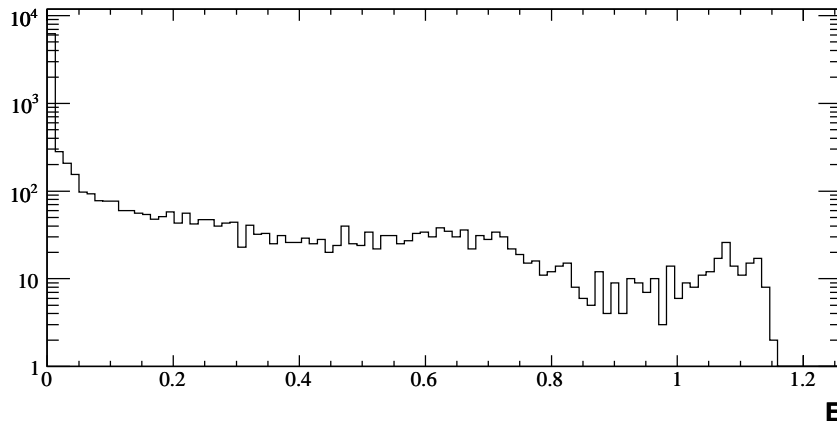
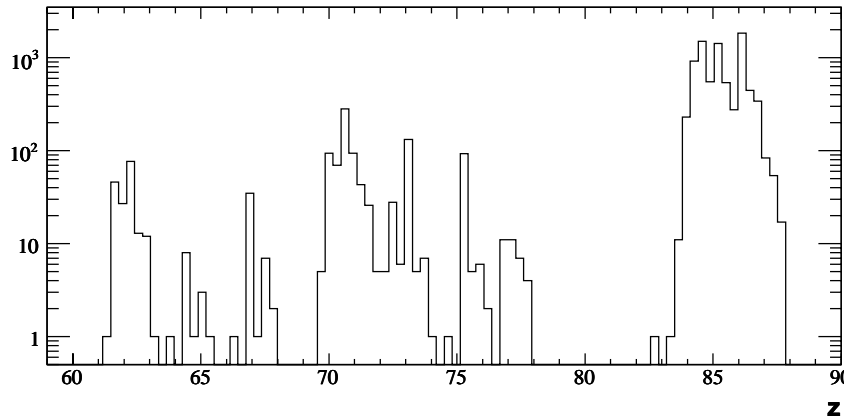


# Using input file from PLACET

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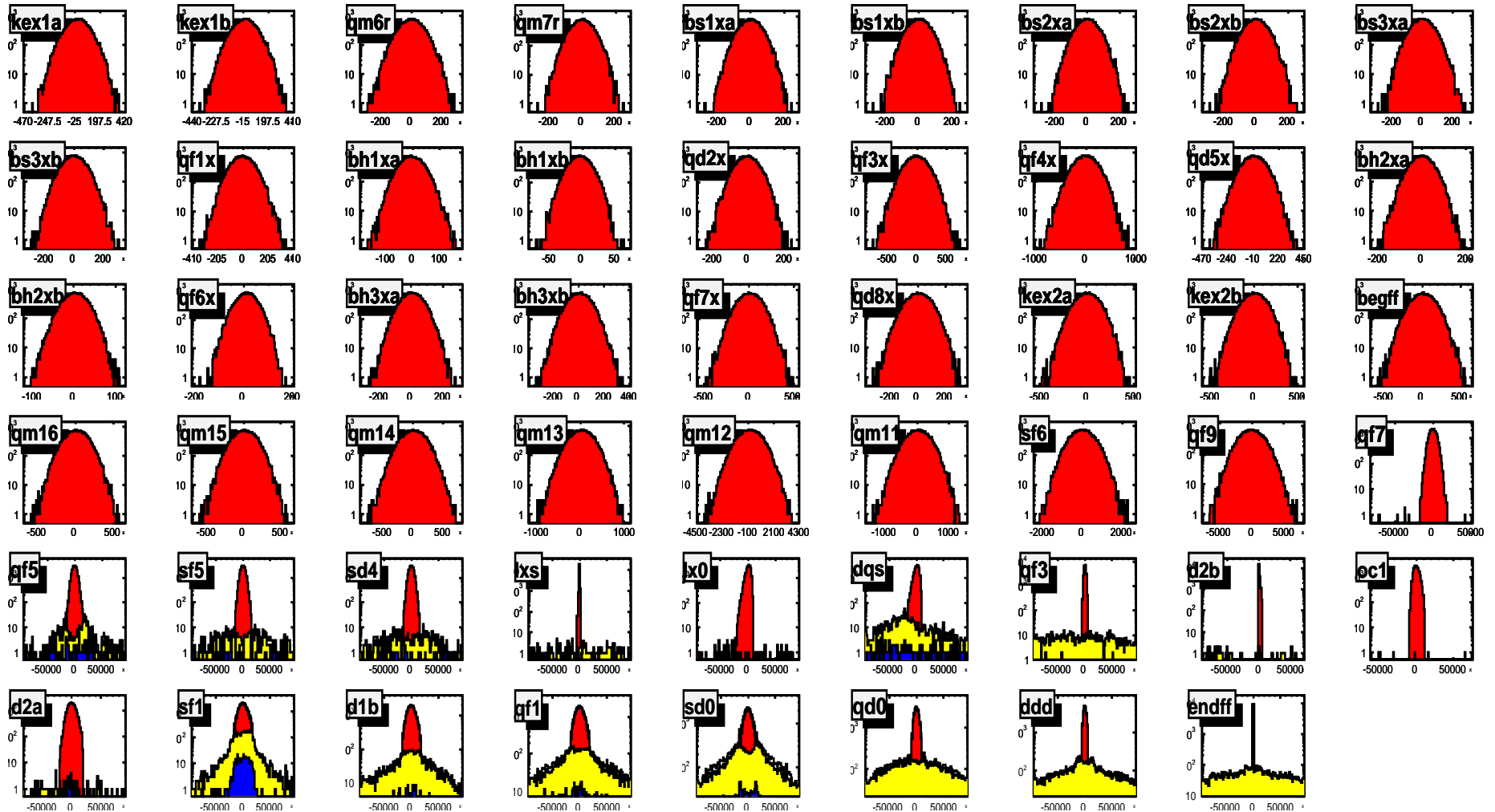
- Which parameters are in ?
- Correlations are already in ?
- At least secondary particles (photons and positrons are created !)

# Energy loss

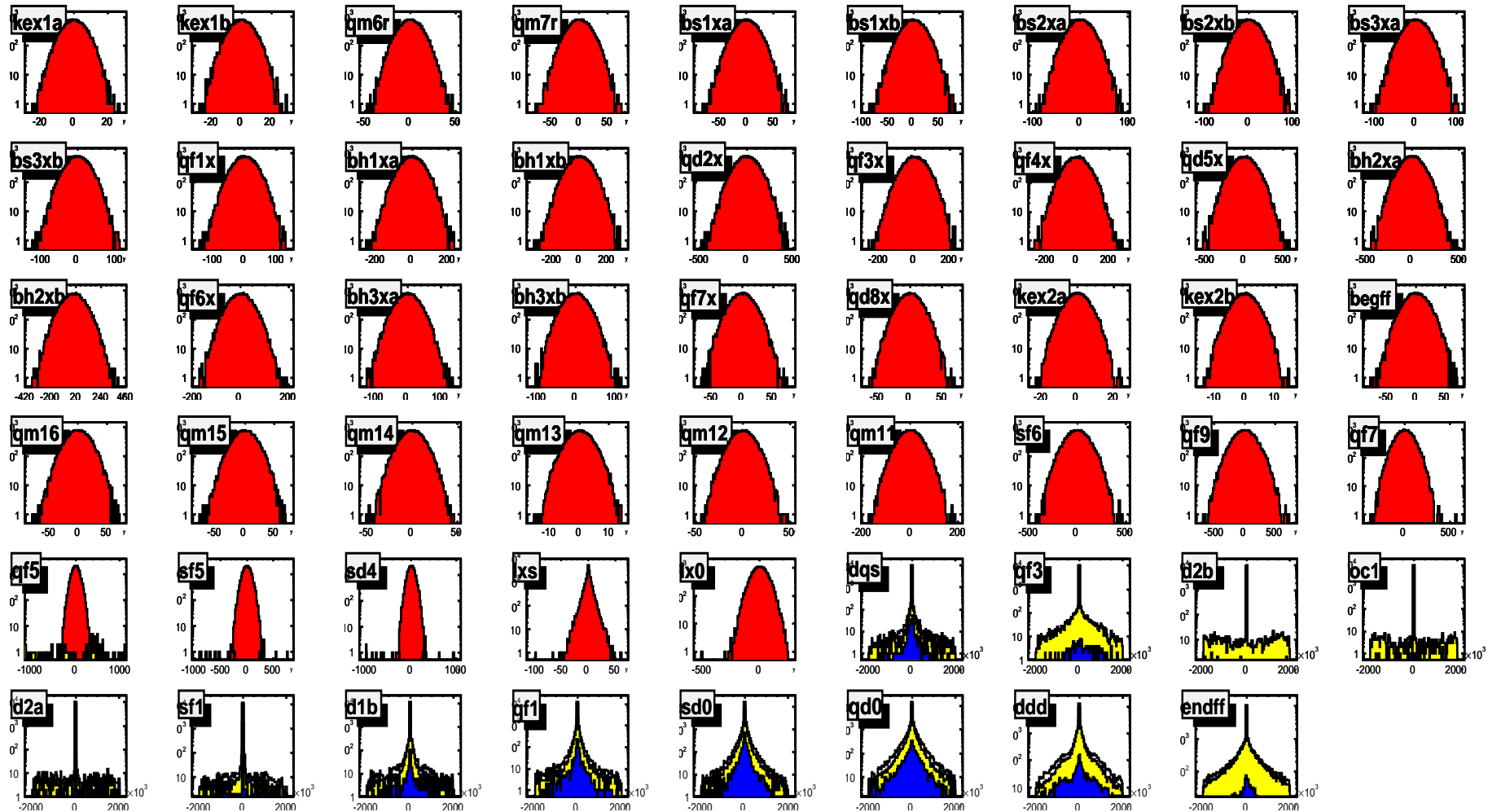


- Energy loss seems to be included
- In the case of Gaussian input beam the parameters might be not correct

# Beam parameters (x)



# Beam Parameters ( $\gamma$ )

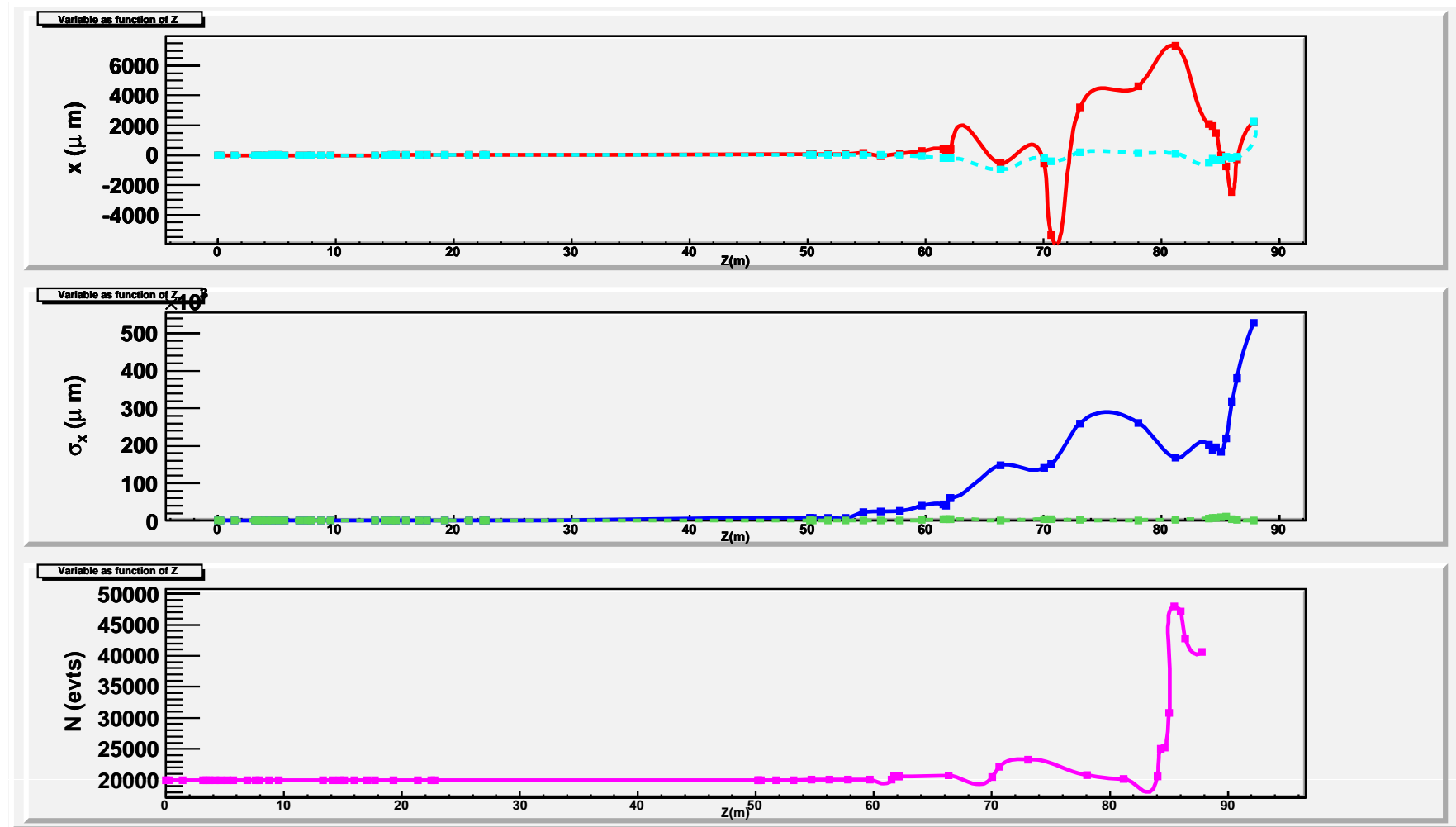


14/06/2007

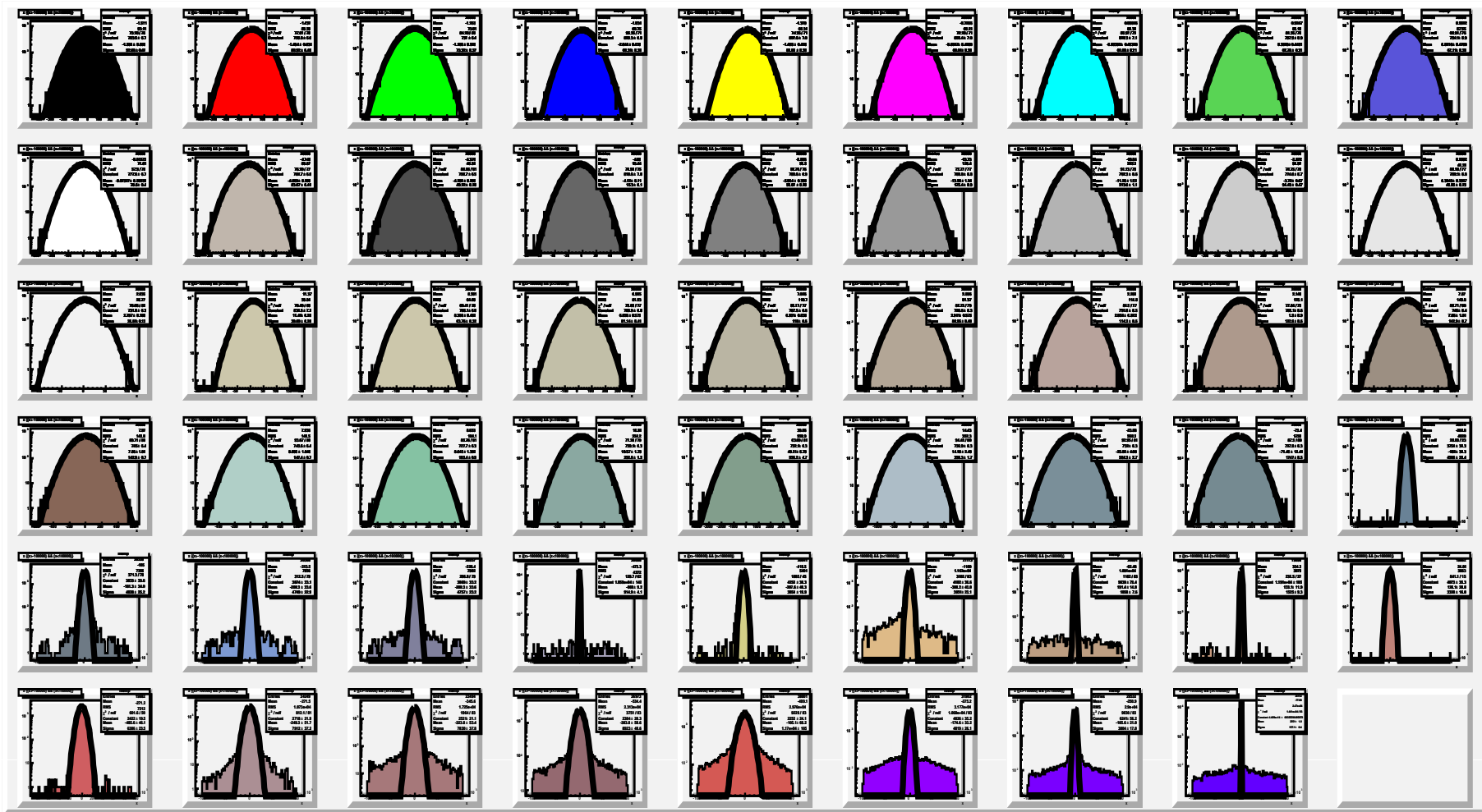
Hayg GULER (LLR)

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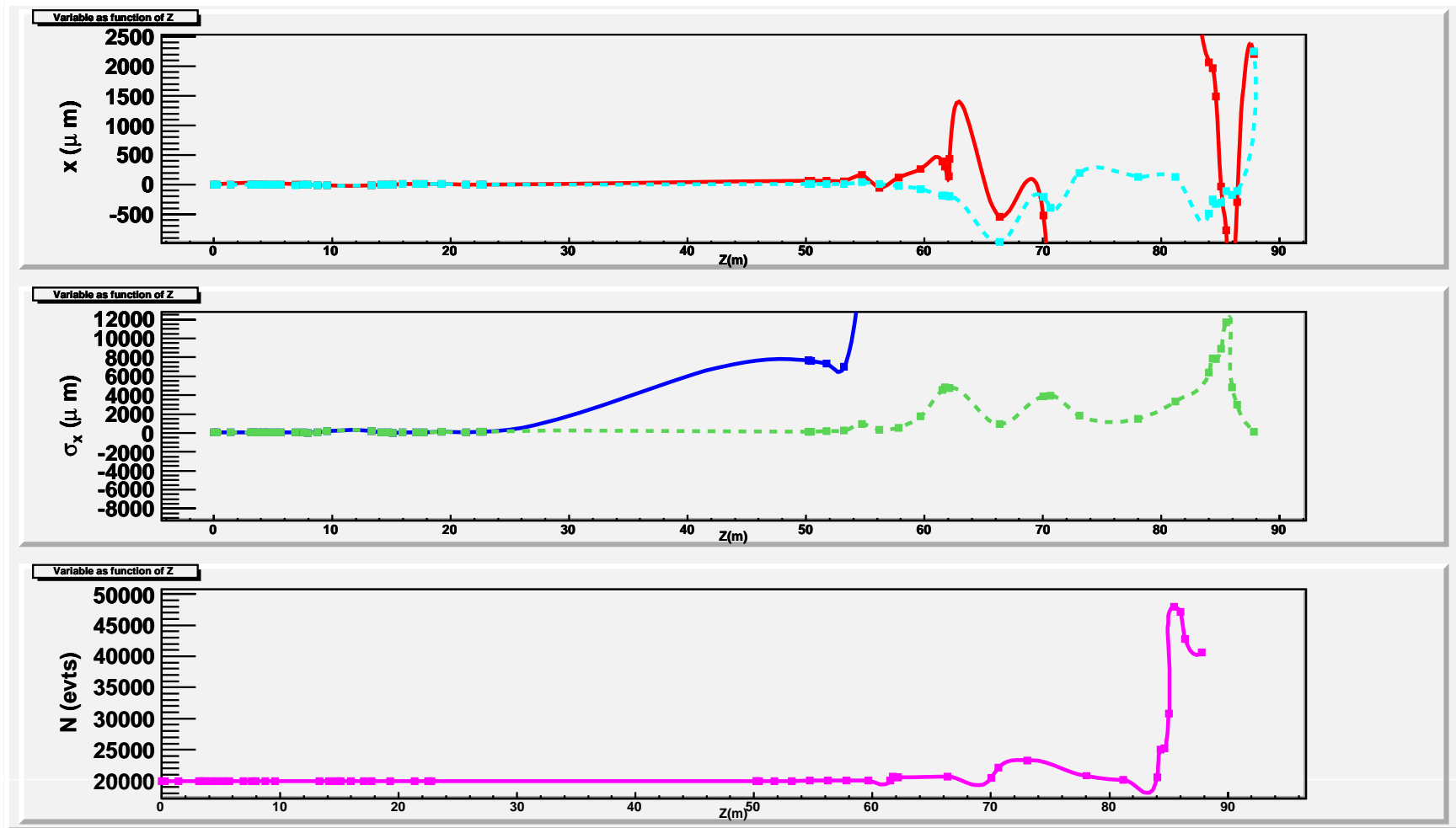
# Beam parameter as a function of Z



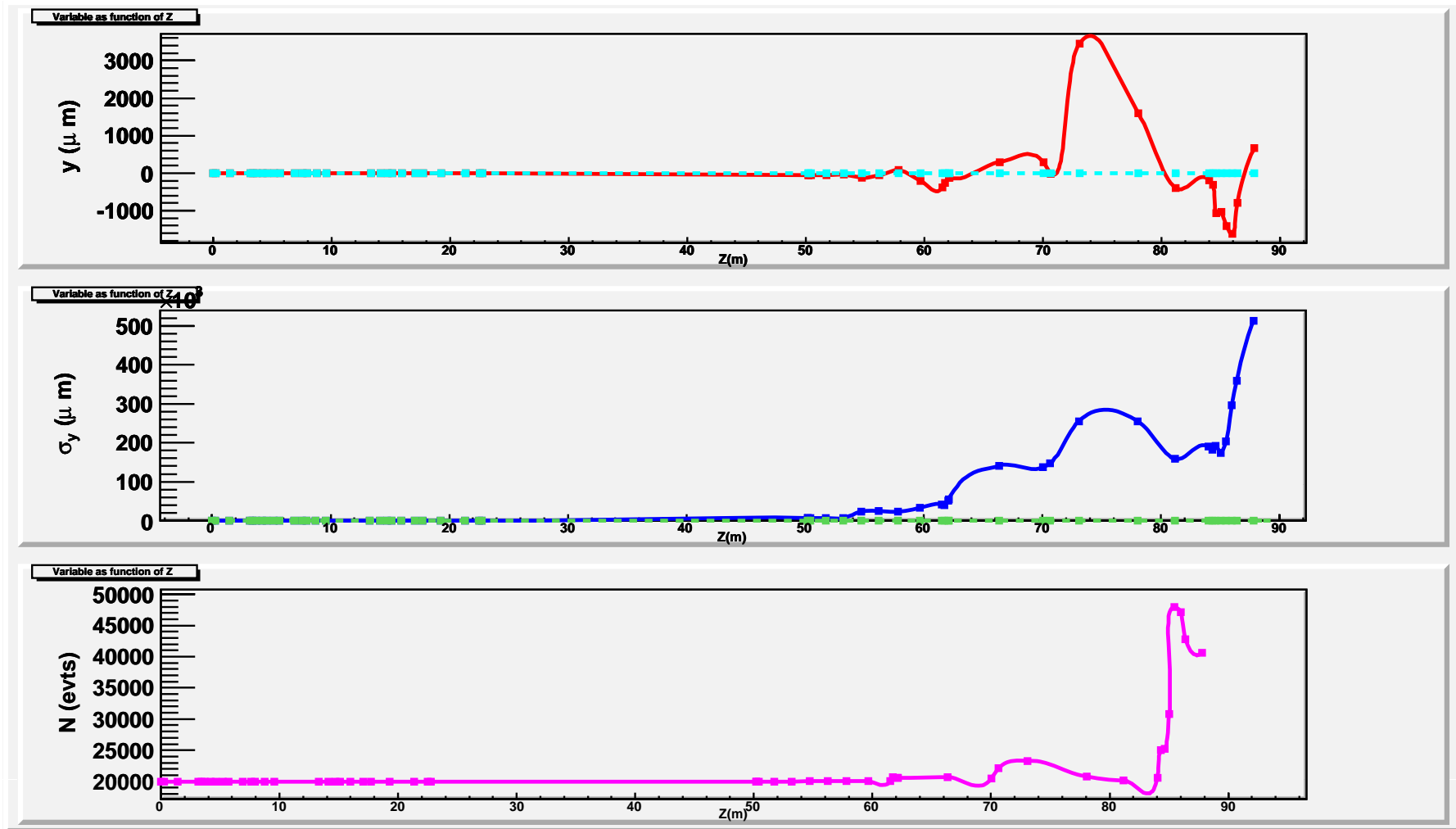
# Beam parameters (x) Gaussian FIT



# Beam parameter as a function of Z (zoom)

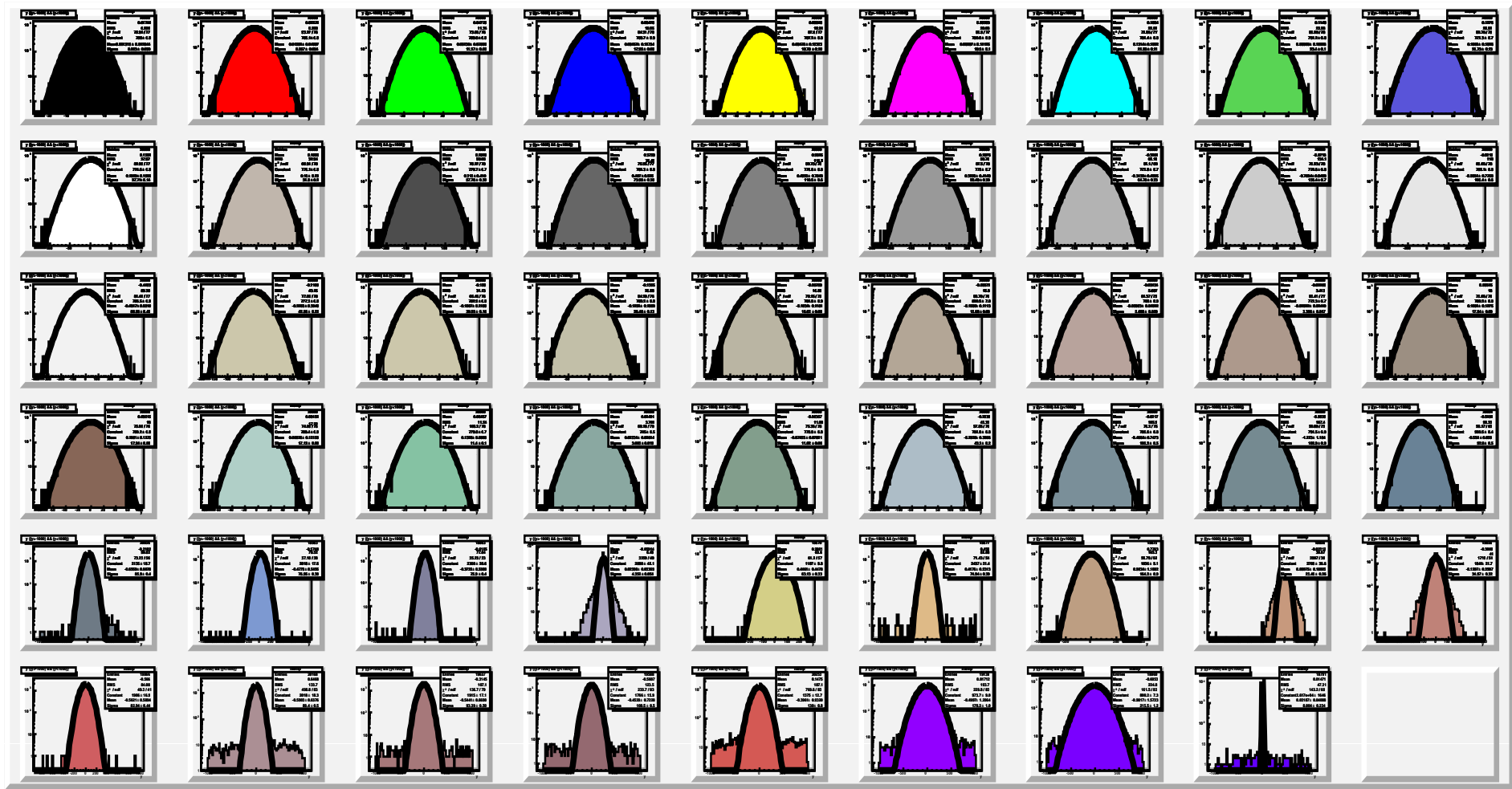


# Beam parameter as a function of Z

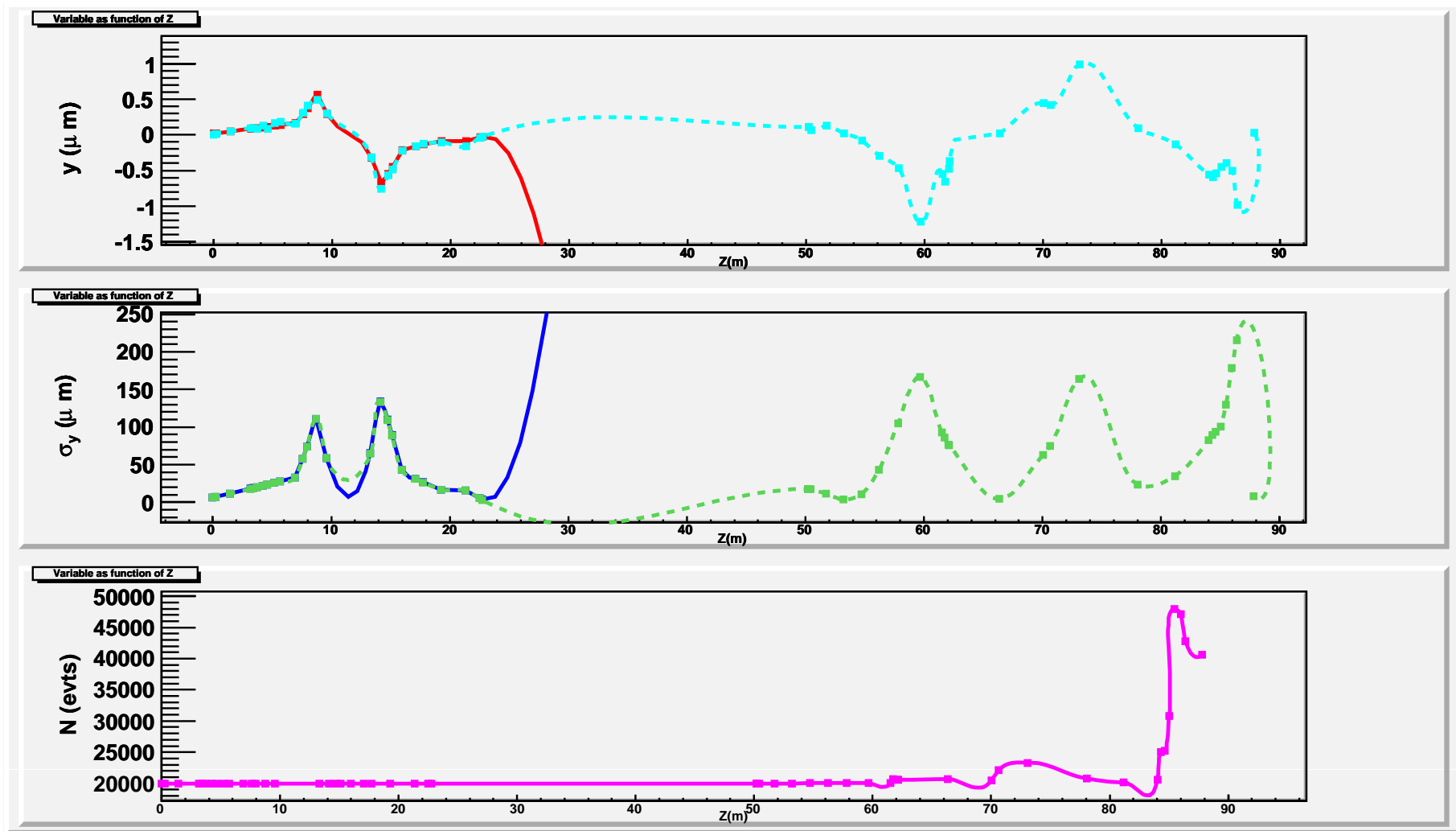




# Beam parameters (y) Gaussian FIT



# Beam parameter as a function of Z (zoom)





# Beam Parameters extraction

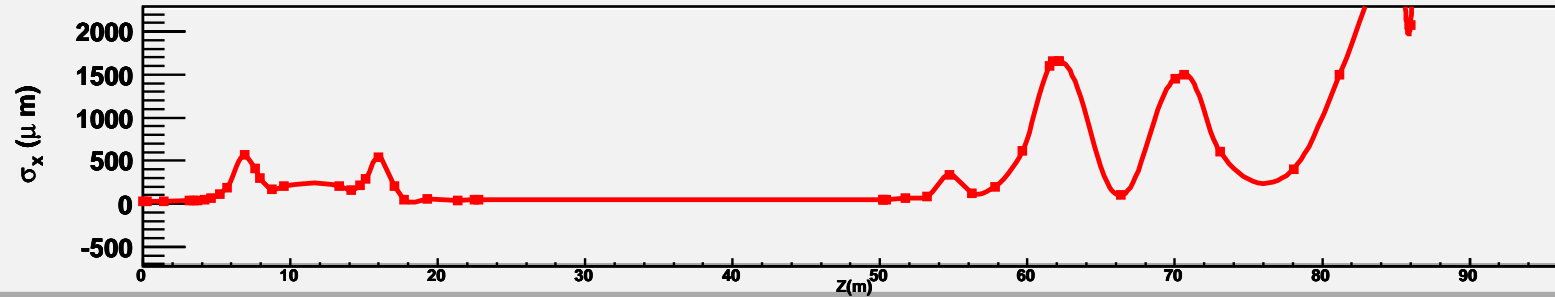
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- From x and y distributions we extracted  $\sigma_x$  and  $\sigma_y$
- From x and  $x'$  distributions one can extract  $\epsilon_x : \sqrt{\langle x^2 \rangle \cdot \langle x'^2 \rangle - \langle x \cdot x' \rangle^2}$
- And then : extraction of the function :

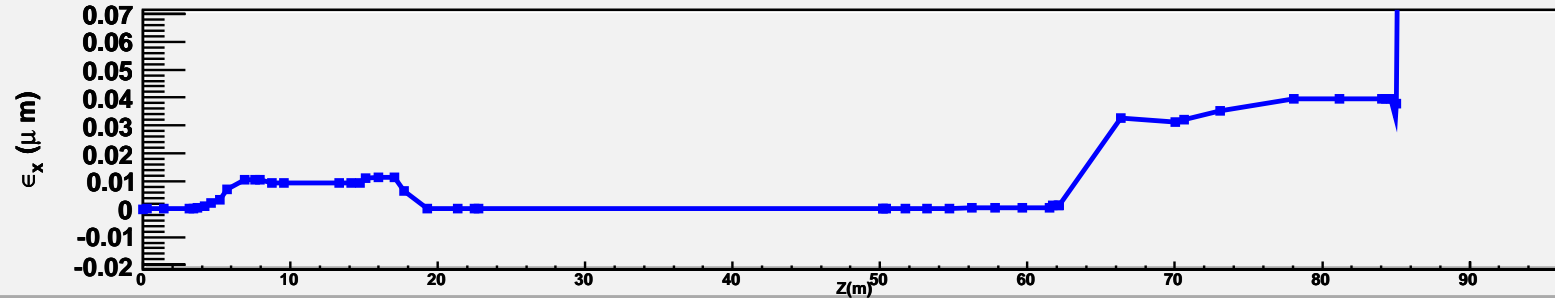
$$\beta_x = \frac{\sigma_x^2}{\epsilon_x}$$

# Gaussian input : X

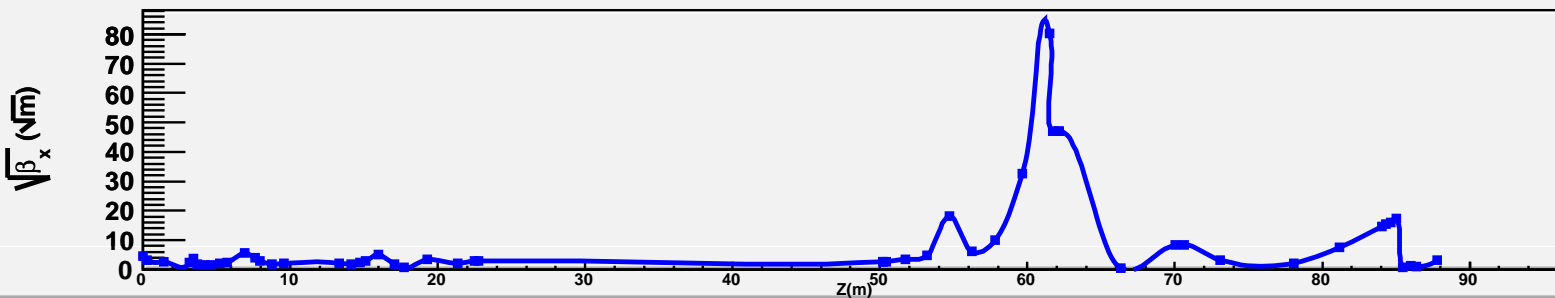
Variable as function of Z



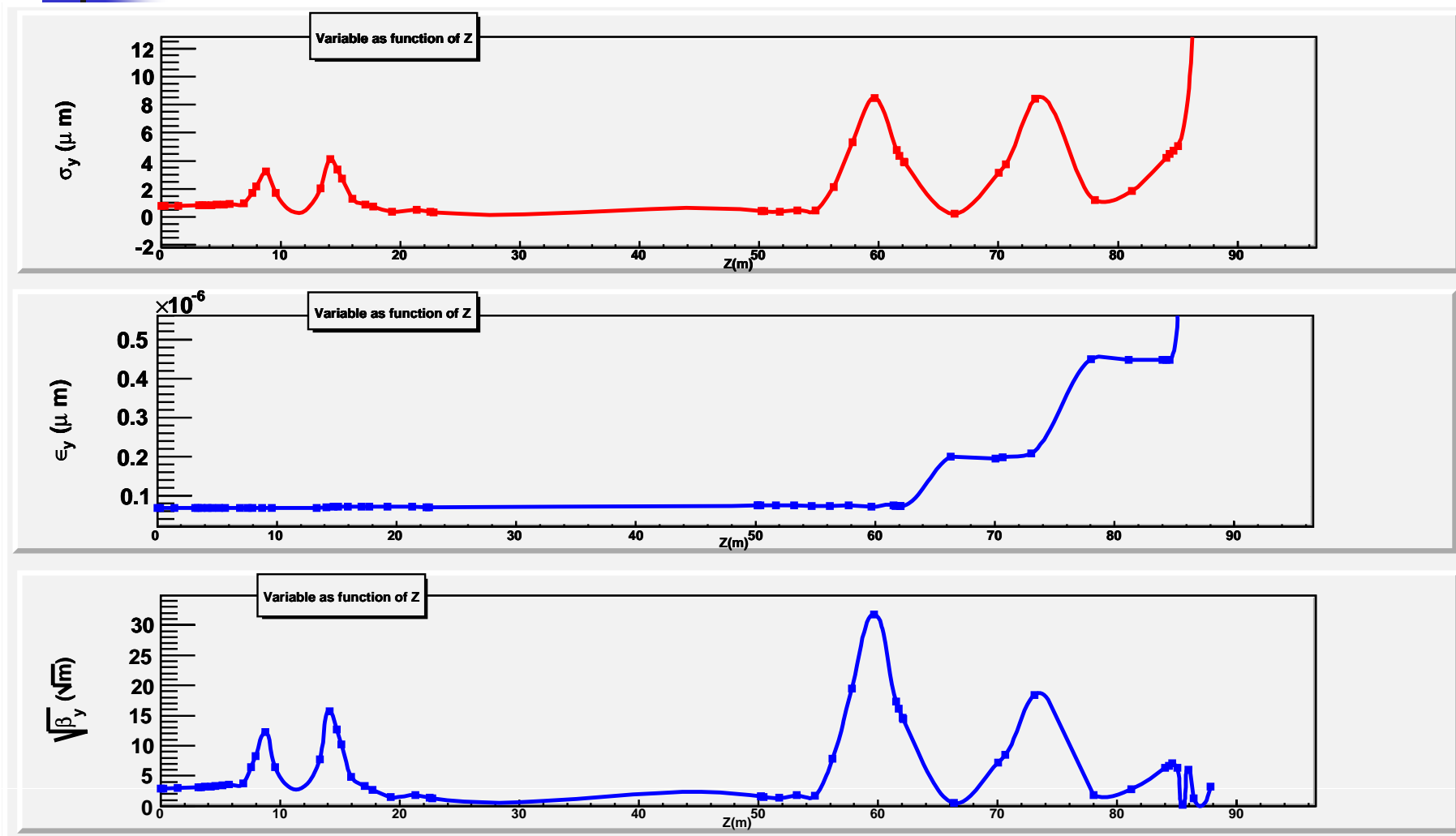
Variable as function of Z



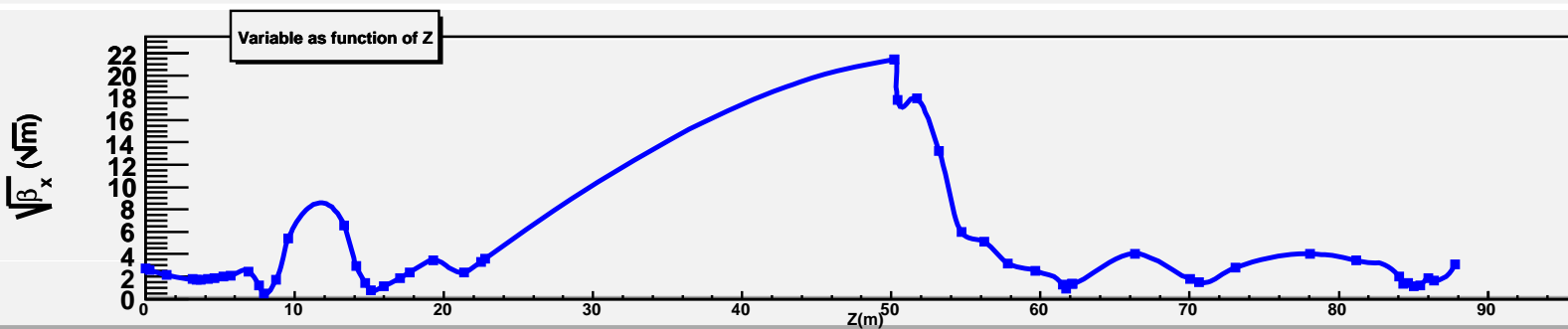
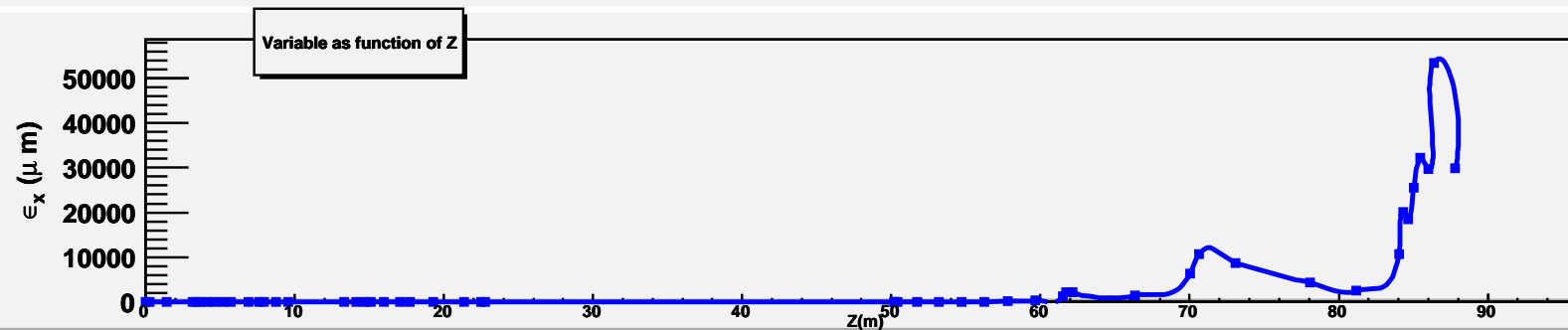
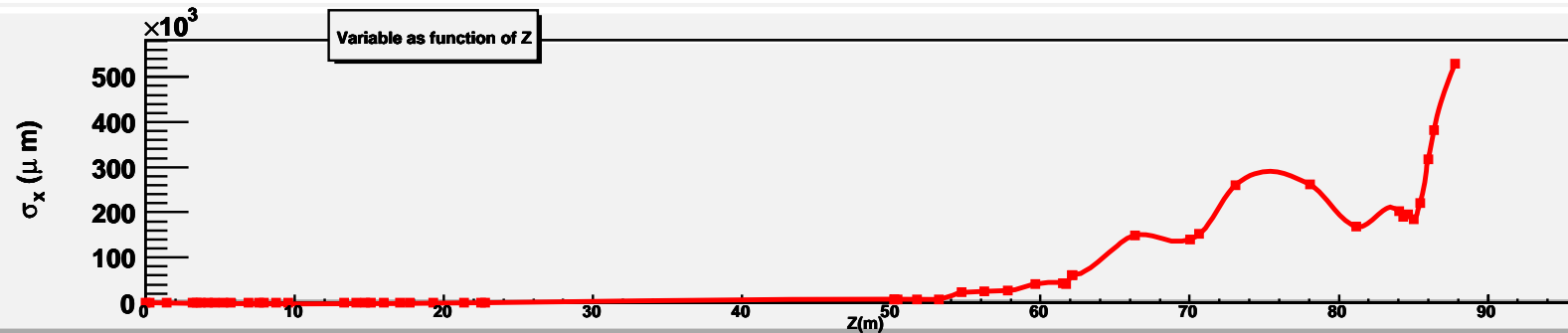
Variable as function of Z



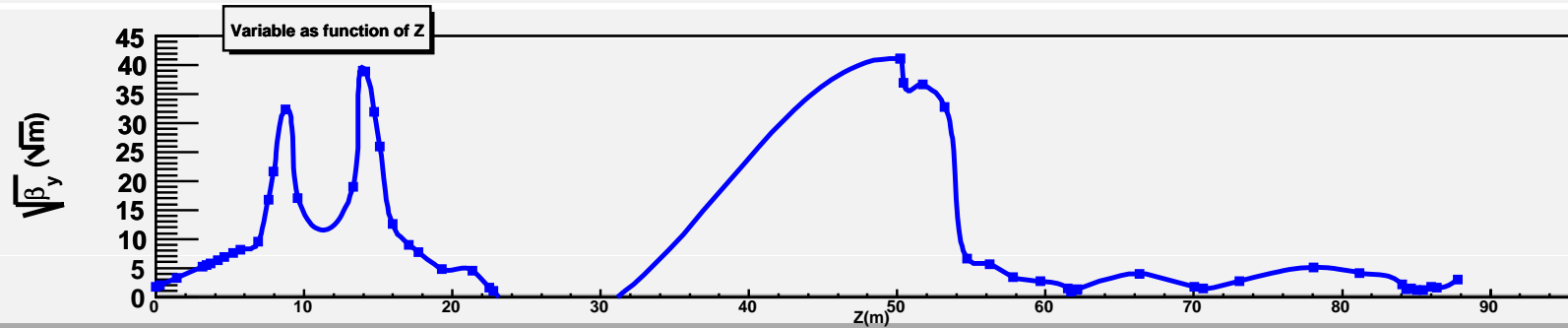
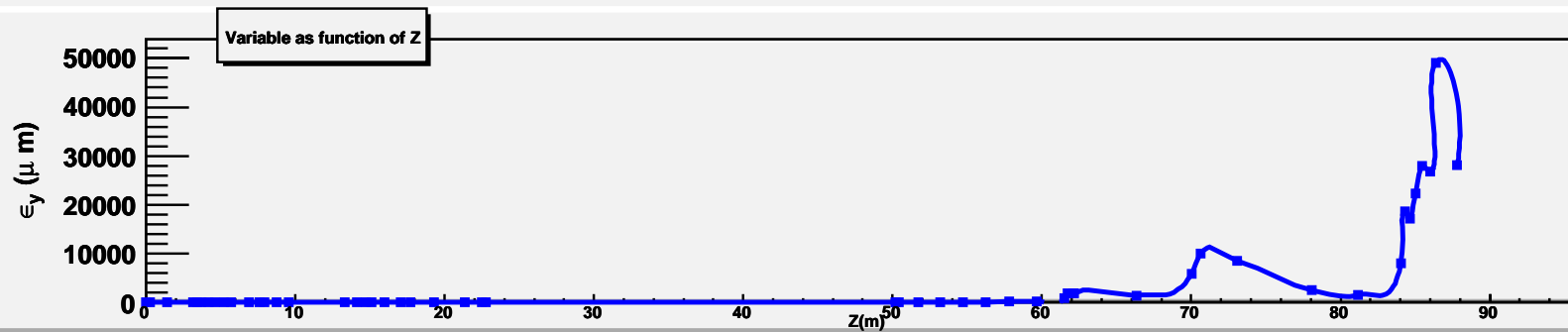
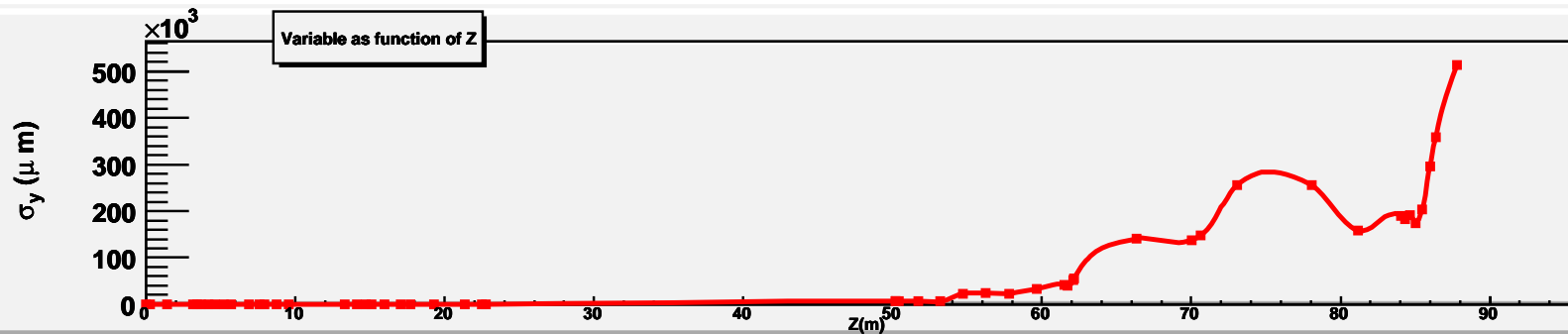
# Gaussian input : Y



# PLACET input : X



# PLACET input : Y





# Open points, Next Studies

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- Gaussian distribution in BDSIM : What is wrong/correct (?)
- BDSIM + PLACET : See if the secondary generation is correct (in andntities and distribution)
- Compare to other codes (optical : Dimad ?)
- Use other input parameters (from ATF)