

E00102 EXPERIMENT- ANALYSIS RESULTS

Kinematics A_{\pm} and D_{\pm}

INDEX of TASKS:

- We already have histograms of the cross section and the reduced cross section of the data and the simulation in $(\Phi, P_{\text{miss}}, q, \omega)$ bins.
- Obtain the **reduced Cross-Section as a function of P_{miss}**
 - Using different bins and cuts in $(q, \omega$ and $\Phi)$
 - Check compatibility of the different kinematics.
 - Check the dependence of the result with the bins and cuts.
 - Check the effect of radiative corrections.
- Obtain the **ALT** from the Cross-Section for central (q, ω)
 - a) **Φ close to $0, \pi$.**
 - b) **Φ weighted by $\text{Cos}(\Phi)$.**
- Study the dependence of the result with larger q, ω .

1) Latest Improvements

No energy loss and radiation were simulated in previous results.

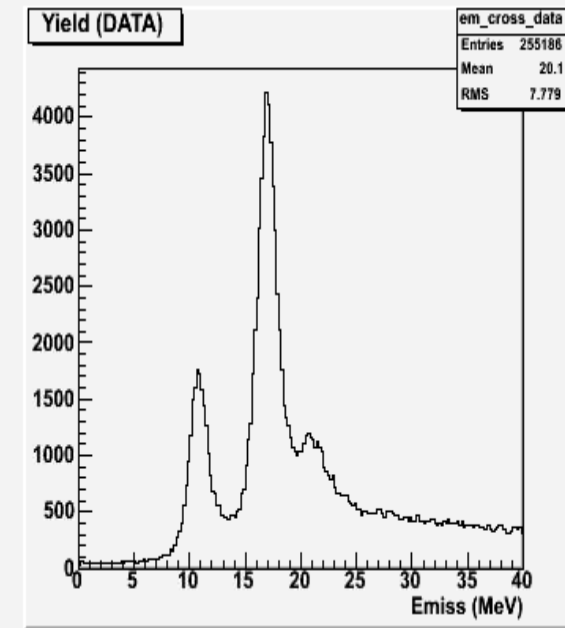
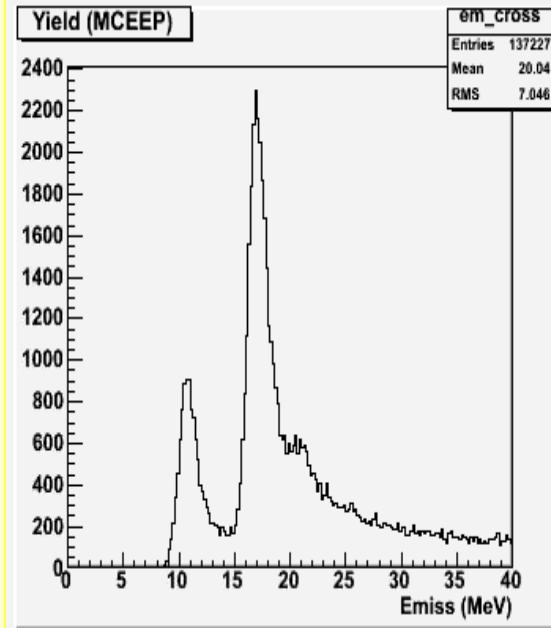
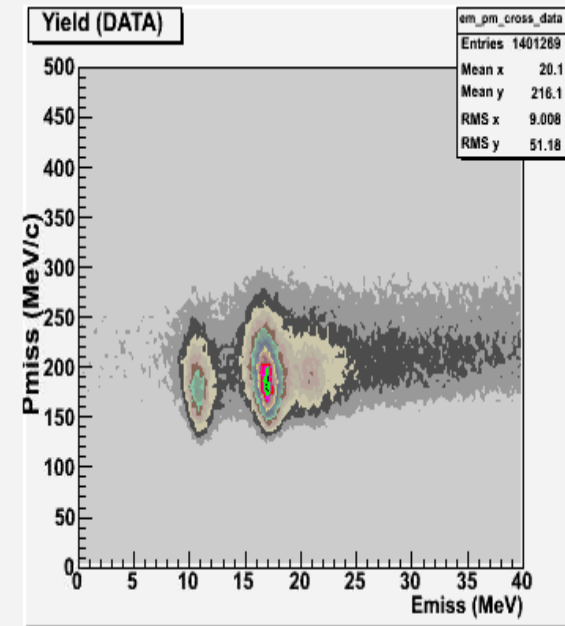
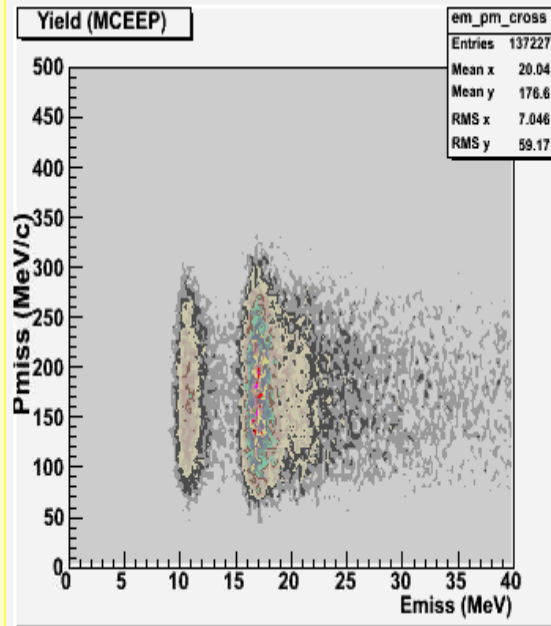
ENERGY LOSS

- Energy loss have now been included in all simulations.

- As the data is already corrected by the mean energy loss (analyzer subroutines from Jeff), we have used this option in mceep:

→ In the target parameters of the input:

ELOSS_EMOD = 2



1) Lastest Improvements

RADIATION

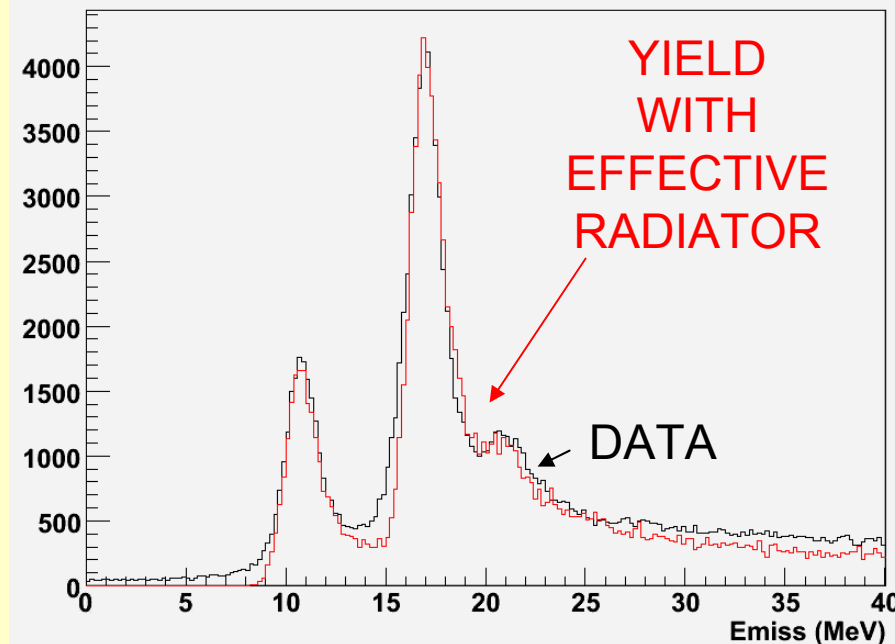
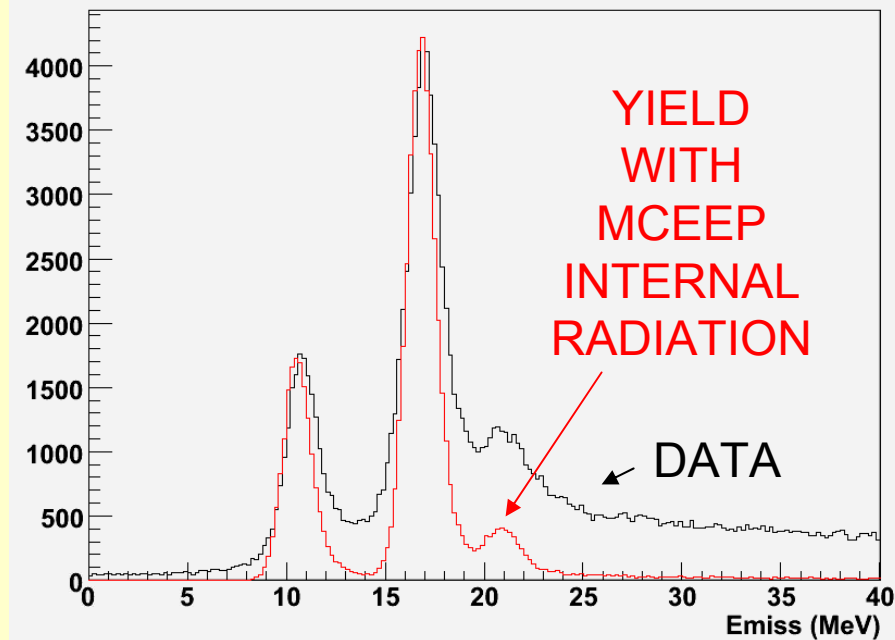
- For the radiation different approaches have been tested:

1) Mceep default external and internal radiation

2) Considering internal radiation with an effective external radiation (Effective External Radiator) from: R.Ent et al., PRC 64, 054610 (2001)

- Easy to implement in mceep: in calc_b.f → We add more “material”:
example:

btw(1) = btw(1) + 0.045



06-NOV-08

1) Latest Improvements

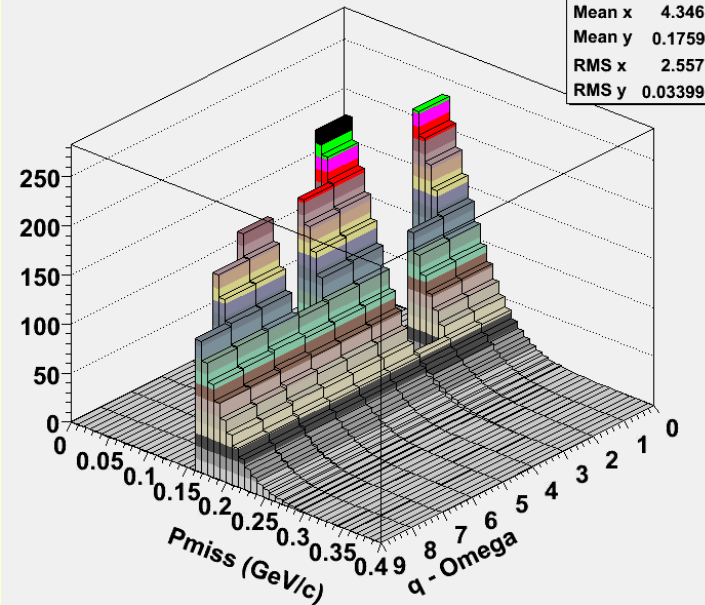
No energy loss and radiation were simulated in previous results.

The reduced cross section in the simulation without radiation was very similar in all (q, ω) bins (although the theory was not factorized).

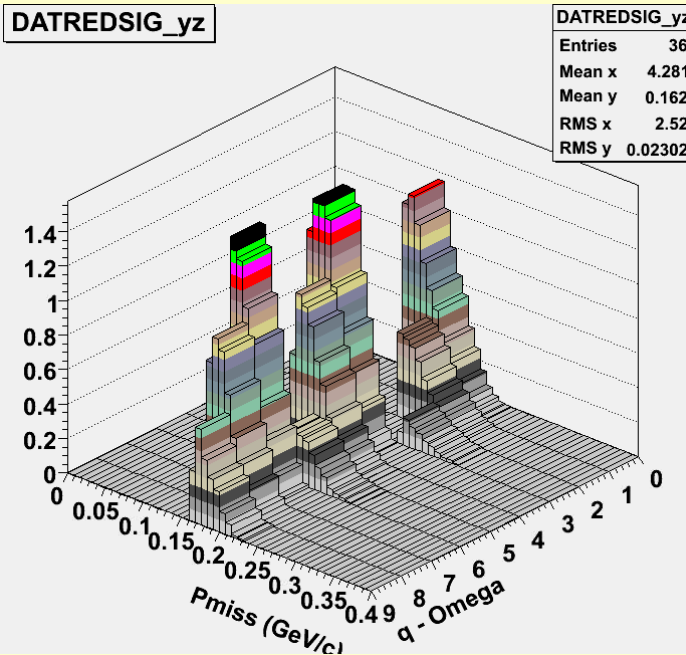
Nevertheless, the data showed a dependence with $q, \omega \rightarrow$ Probably due to radiation (and no factorization).

*Previous Reduced Cross section as a function of P_{miss} and q - ω bins.
TOP: Mceep simulation without radiation and e_{loss}
BOTTOM: Data*

SIMREDSIG_yz



DATREDSIG_yz

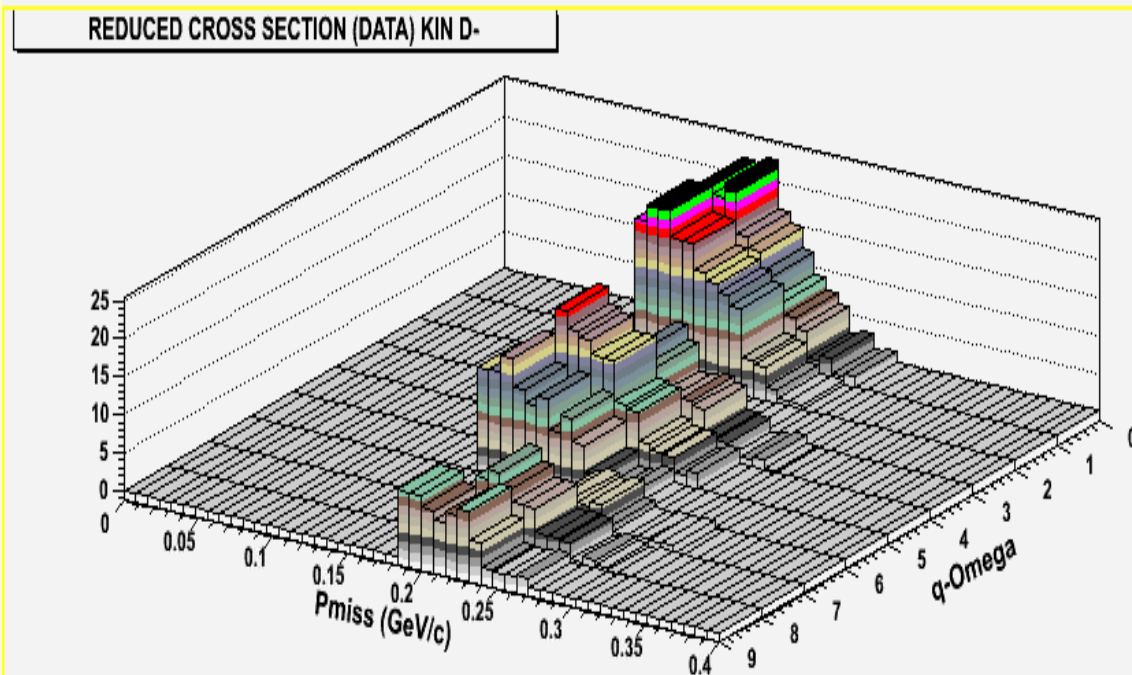
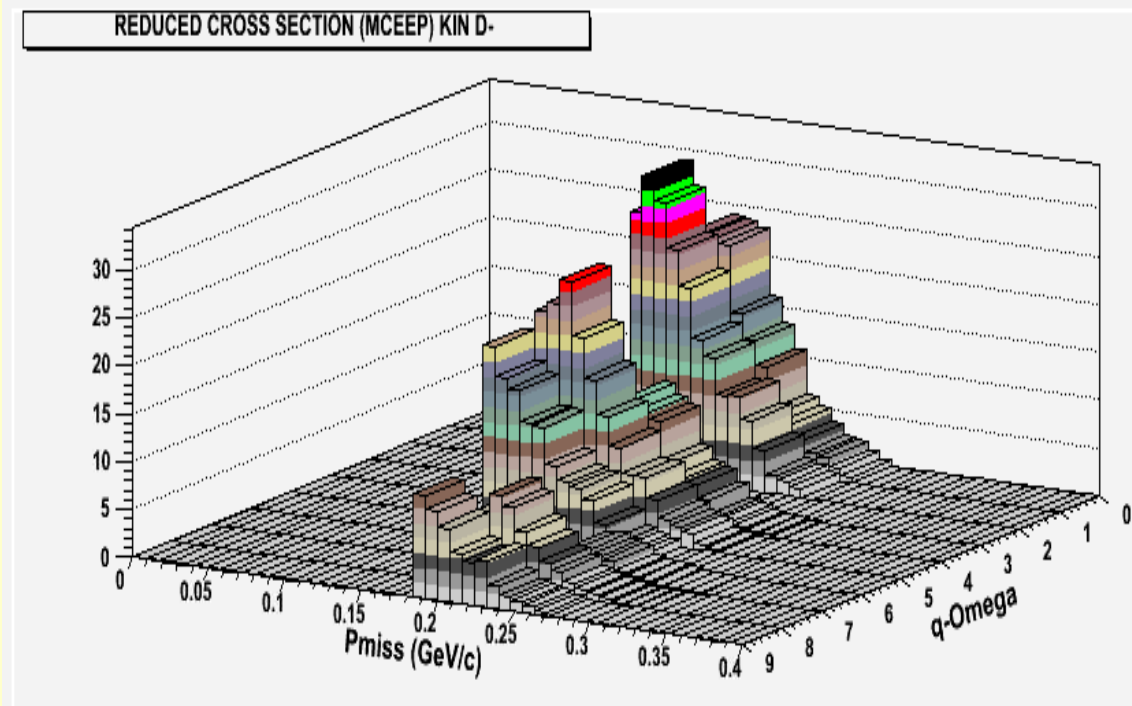


1) Latest Improvements

No energy loss and radiation were simulated in previous results.

This made the result of the reduced cross section very similar in all (q, ω) bins (although the theory is not factorized)

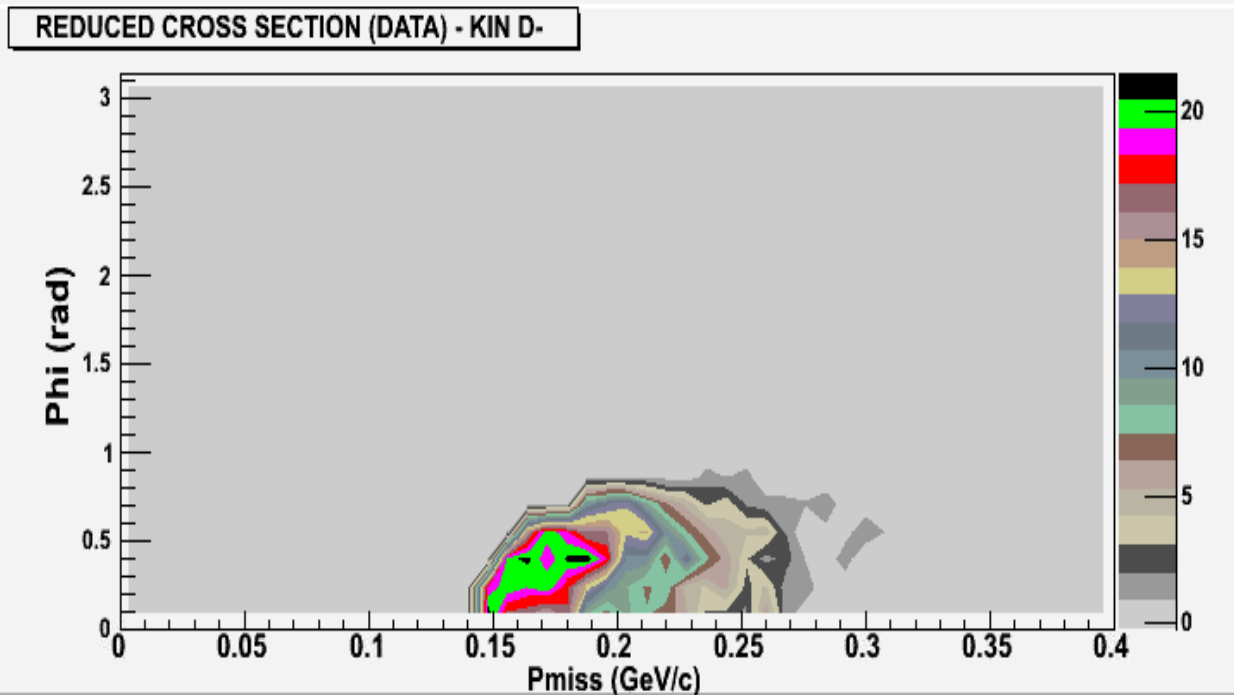
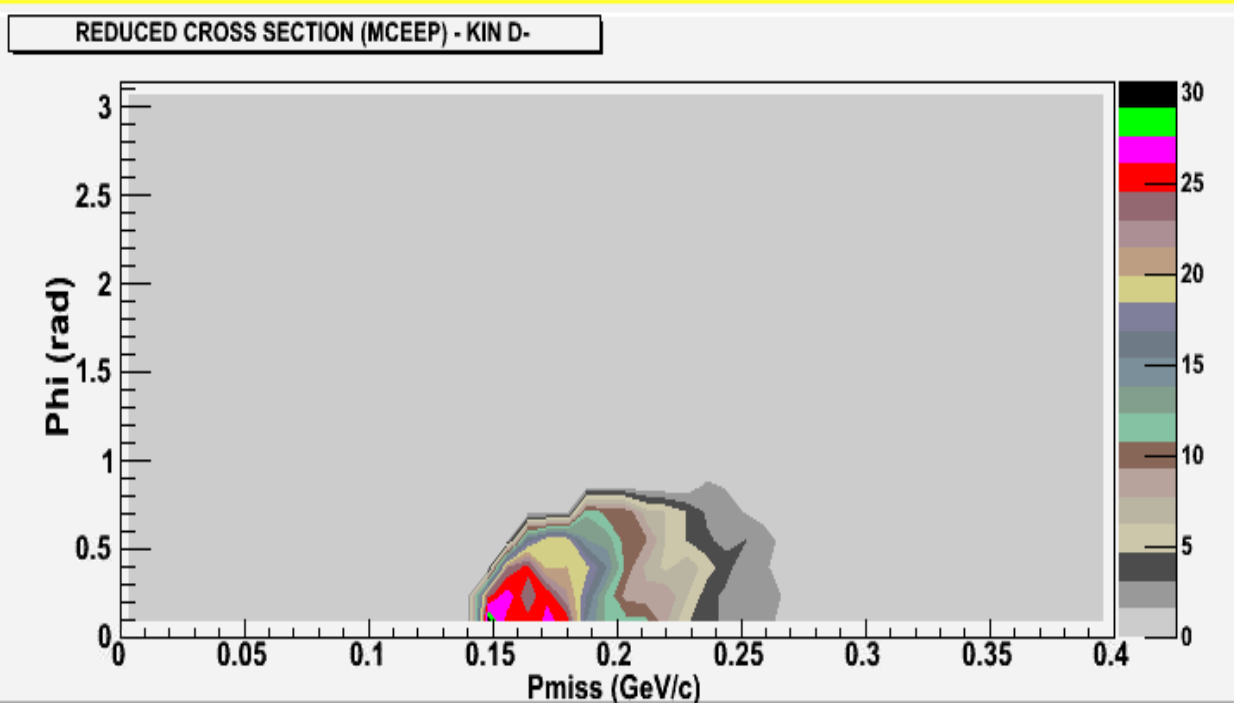
Kin D- \rightarrow Reduced Cross section as a function of P_{miss} and Φ (Out of plane angle). TOP: Mceep simulation BOTTOM: Data



1) Latest Improvements

There was a problem in Phi definition from Mceep. Now that it has been corrected we obtain much more similar distribution in Phi comparing data and simulation.

Kin Dm \rightarrow Reduced Cross section as a function of Pmiss and Phi (Out of plane angle). TOP: Mceep simulation BOTTOM: Data



2) Latest Bugs

Using the method of Project3D to obtain the plots of the cross-section against ϕ, p_T, q -omega, I forgot to divide by the number of bins projected. We want to get the mean, not the sum in a projection.

Due to the cuts, the number of bins in each variable with $PS > 0.5$ is not constant. Now it is solved by creating a 3D histogram for the Phase-Space with 1 if $PS \geq 0.5$ and 0 if $PS < 0.5$. Dividing each projected histogram by the projection of the normalizing phase-space, we get the expected results.

Found a bug in mceep when Yield (option 1, instead of cross section option -1) was simulated. The simulated data was scaled by a number that was not correct. Checked using Cross-section=1 (by hand) and we didn't obtain the expected yield considering the luminosity.

So far we have been simulating cross sections, so this doesn't affect us.

DATA VS SIMULATION (Pmiss)

