Mathieson parameters & w distribution (update)

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Outline

1. Remember...
2. w flatness
3. Update on the understanding of w distribution for MC
4. Suggestions

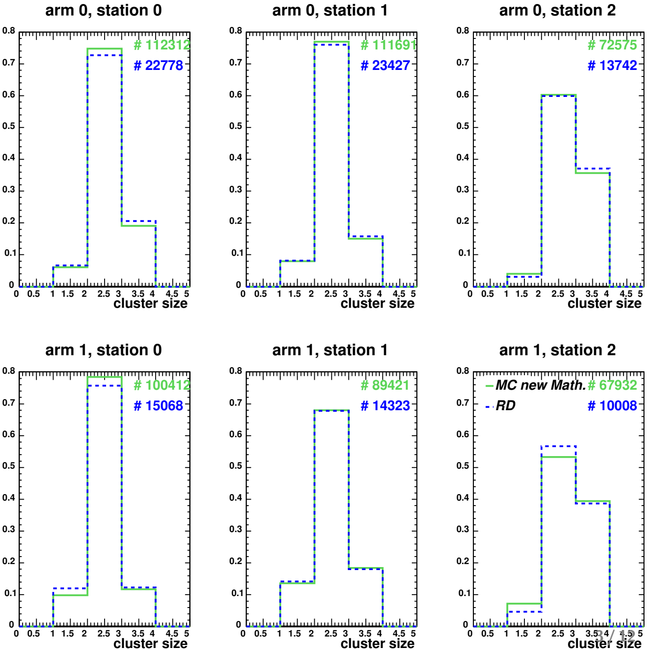
MC and RD cluster size with found Mathieson parameters

Remember...

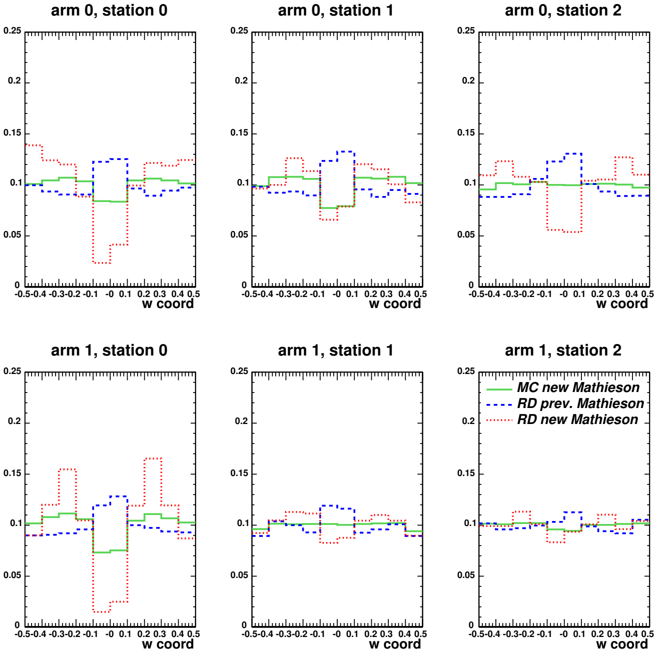
New mathieson parameters were find so that MC and RD cluster size match better.

However, such parameters would modify the *w* distribution as reminded in the next slides.

Further studies are shown here to understand what would make this distrubution not flat anymore.



MC vs RD w flatness ($w = w_{peak} - w_{fit}$) [1/2]

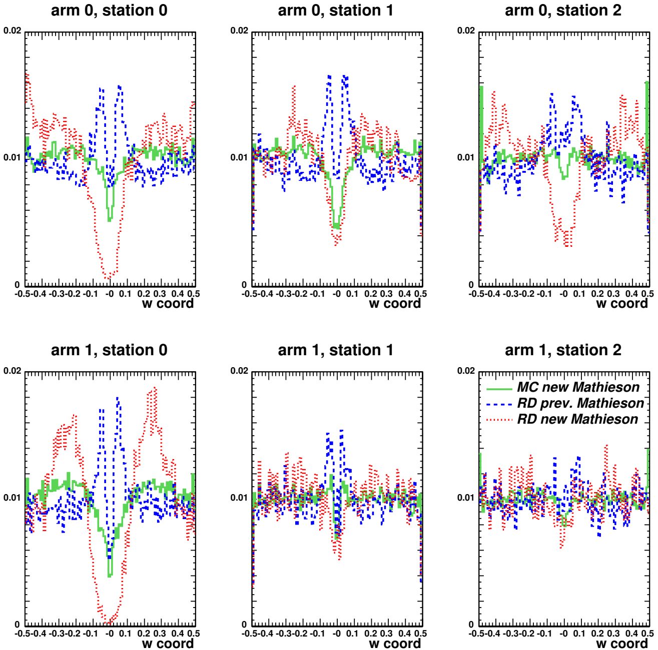


MC with new Mathieson parameters
RD with old Mathieson parameters (less stats)
RD with new Mathieson parameters

Mathieson parameters have changed the RD w shape.

The distribution is not flat and differs a lot between RD and MC.

MC vs RD w flatness [2/2]



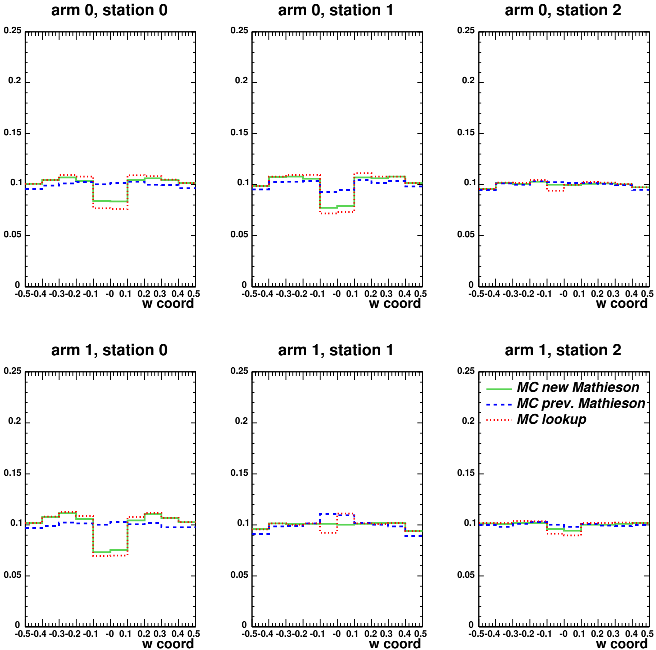
MC with new Mathieson parameters
RD with old Mathieson parameters (less stats)
RD with new Mathieson parameters

Same plot as previously but with a smaller binning.

RD and MC with the new Mathieson parameters tend to behave the same way.

The following slides focus on w distribution for MC.

Why isn't w distribution flat for MC ? [1/6]



MC with new Mathieson parameters

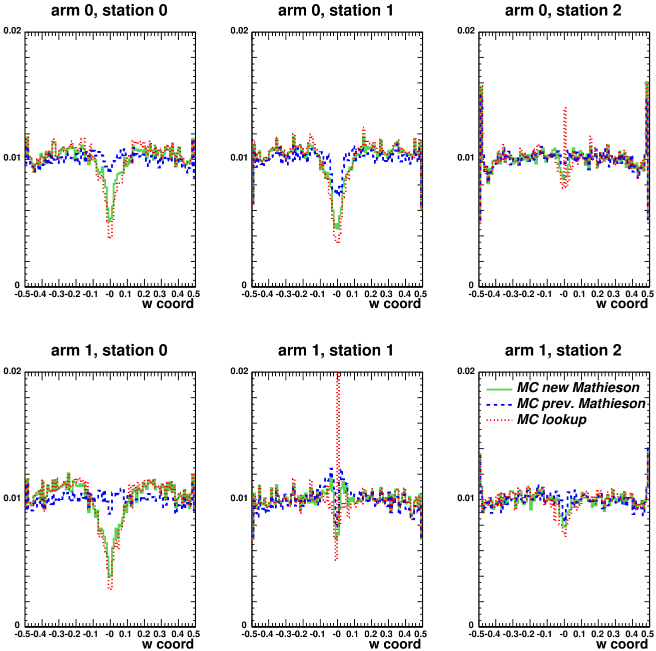
MC with old Mathieson parameters

MC using the lookup table instead of the GSL fit

Coherent generation of the clusters (mMut-SlowSim) and the fit (mMutFitClus). So why is there a hole around $w = 0$?

GSL and Mathieson fit behave identically: no problem with the GSL fit.

Why isn't *w* distribution flat for MC ? [2/6]



MC with new Mathieson parameters

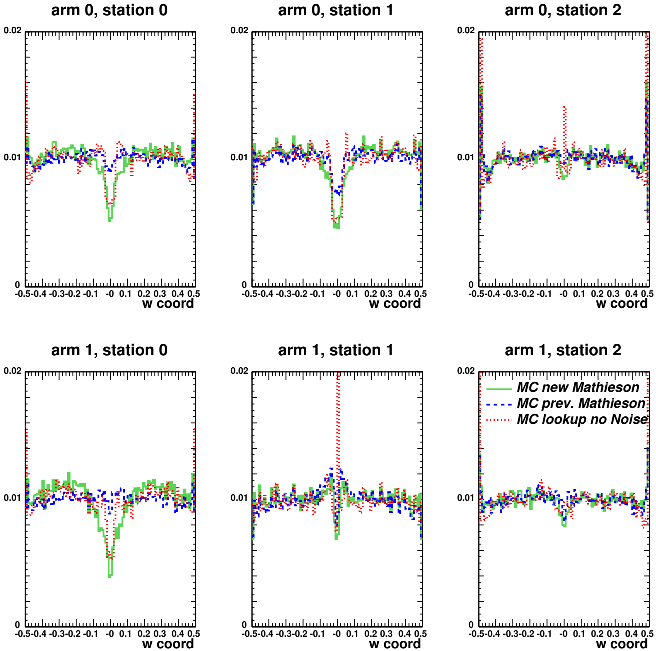
MC with old Mathieson parameters

MC using the lookup table instead of the GSL fit

Same plot as previously but with a smaller binning.

The deep was already here with the previous Mathieson parameters configuration for some stations. However, the new parameters do seem to have encreased it.

Why isn't w distribution flat for MC ? [3/6]



MC with new Mathieson parameters

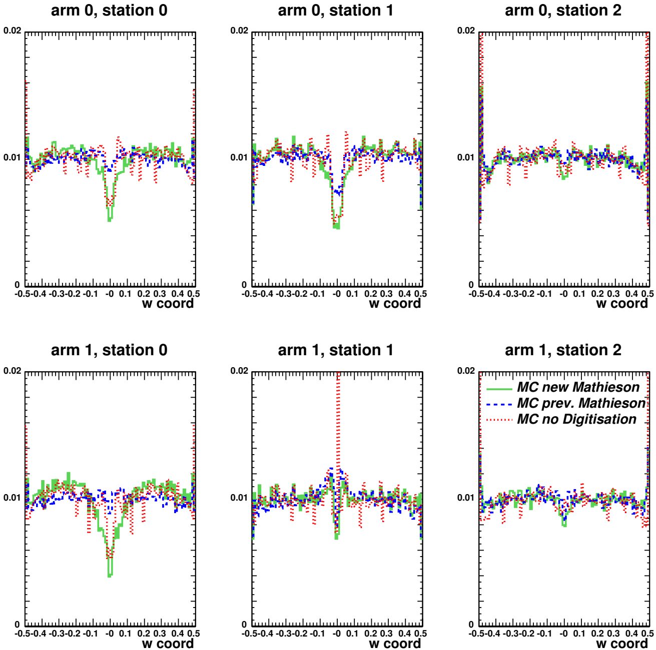
MC with old Mathieson parameters

MC with the lookup table but without noise

Here, the additional noise has been removed from the pattern reconstruction on the red distribution.

This do not make the distribution flat.

Why isn't w distribution flat for MC ? [4/6]



MC with new Mathieson parameters

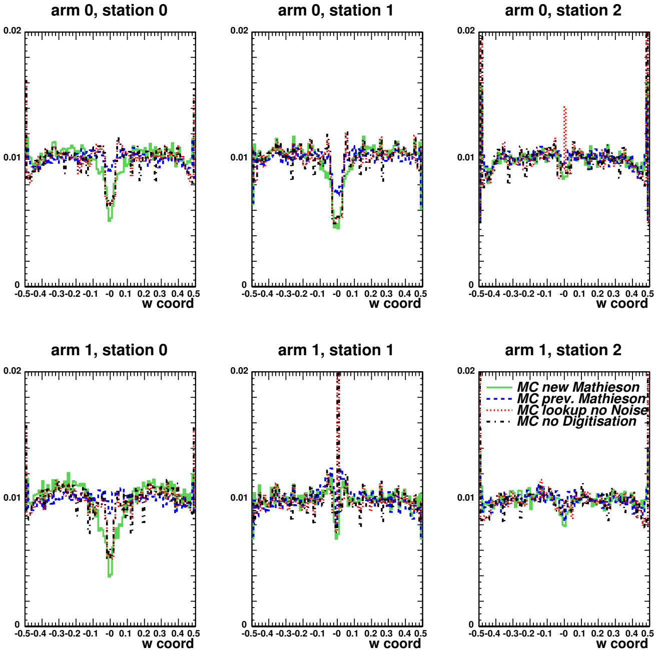
MC with old Mathieson parameters

MC with the lookup table but without noise and digitization

Here, the additional noise and the digitization stage have been removed from the pattern reconstruction on the red distribution.

This do not make the distribution flat.

Why isn't w distribution flat for MC ? [5/6]

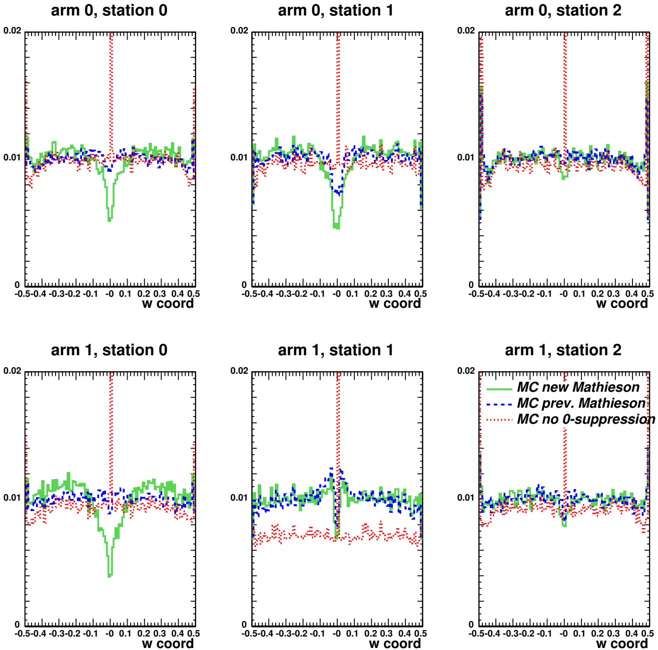


MC with new Mathieson parameters
MC with old Mathieson parameters
MC with the lookup table but without noise
MC with the lookup table but without noise and digitization

This plot is only to superimpose the distribution without noise, and without digitalization on top.

The 2 distributions are identical.

Why isn't w distribution flat for MC ? [6/6]



MC with new Mathieson parameters

MC with old Mathieson parameters

MC with the lookup table but without noise, digitalization and 0-suppression

Removing the 0-suppression makes the distribution flat (appart from the bin at $w = 0$).

Suggestions

Summary

- Optimal Mathieson parameters make the $w$distribution not flat for RD nor for MC.
- The distribution is flat for MC with removing the 0-suppression.

Comments

- It seems that after the 0-suppression the charge distribution is not well reproduced by a Mathieson fit. Should we adjust the Mathieson fit if it is the case ?
- To confirm this suggestion, we could take a run without 0-suppression to see if w is flat for RD.