LC Physics Meeting

Status report

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Introduction

- Context of Zp analysis
  - RHNM model not implemented in WIZHARD
  - Need for a realistic smearing
- ttbar event in full simulation available
  - Main (only) background for e^+,e^- -> t,tbar,Zp
  - CLIC_ILD_CDR detector + PFA reco.
  - $\gamma\gamma$ -> hadr. Included
- ttbar events -> info. to smear Zp events

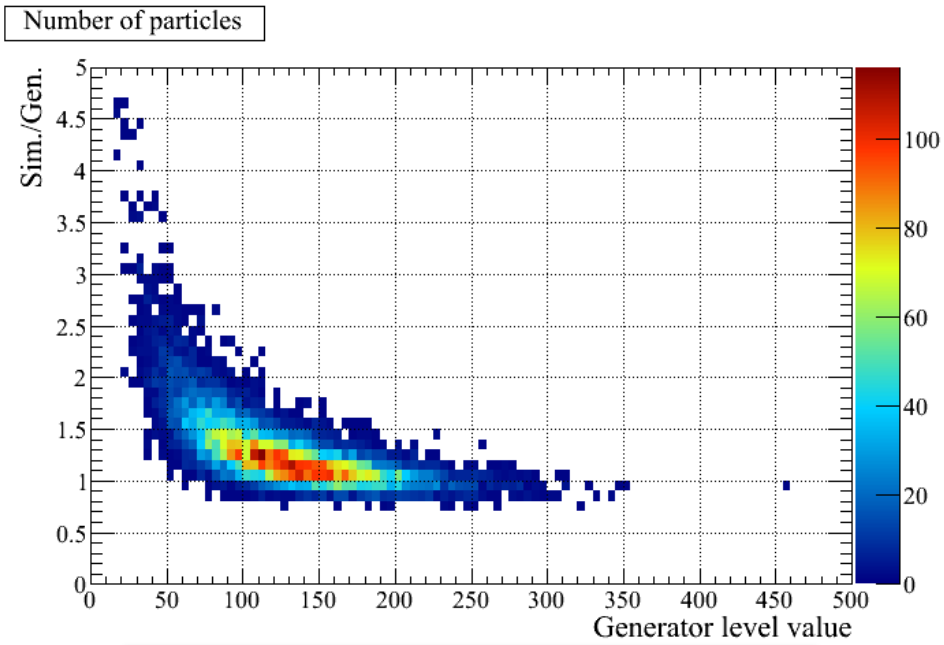
Strategy

- Smearing at particle level ?
  - Smear E, P_i -> ok
  - Smeared number of particle ?
  - Effect of $\gamma\gamma$->hadr. ?
- Smear finalstate variables ?
  - Independent of individual PFO history
  - For each variable : sim./gen. vs gen.

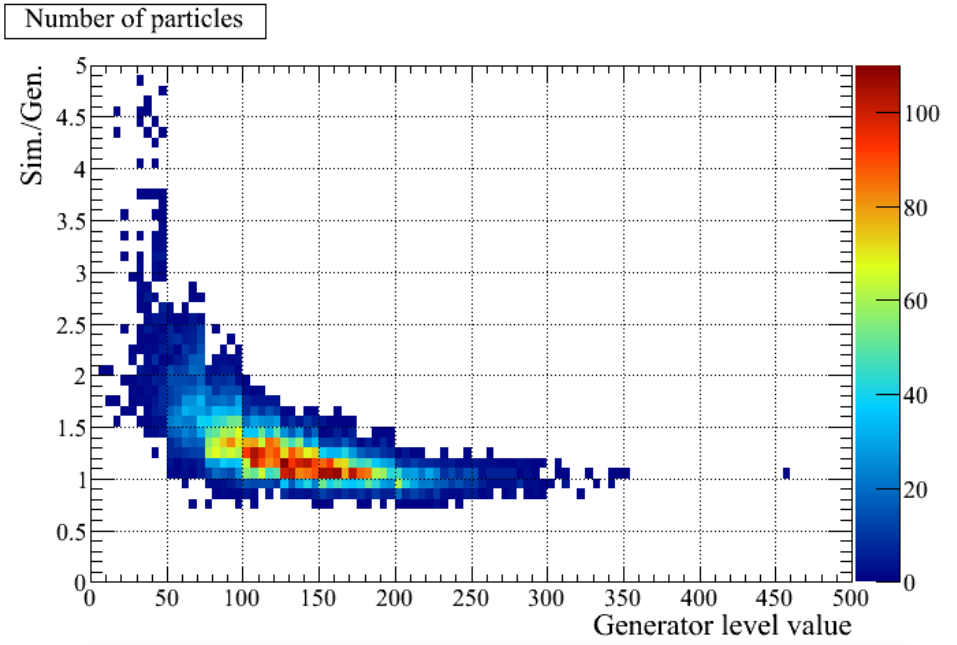
Sim./gen. vs gen.

On ttbar events:

1. Cut left plot in “reasonable” slices and fit them individually.
2. For each gen. value a smear factor is randomly chosen folowing the distribution of the corresponding slice.



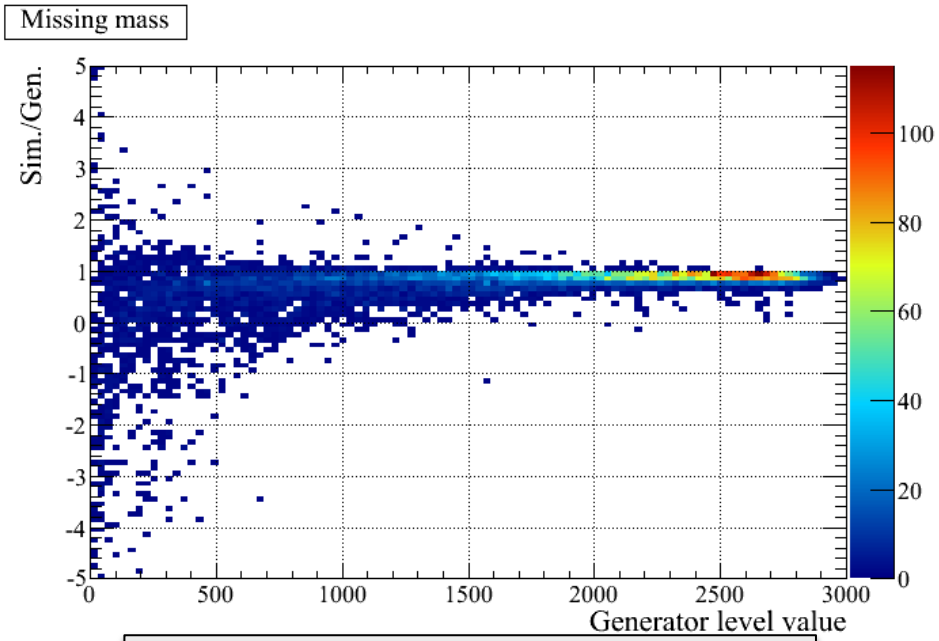
Measurement from full sim. data



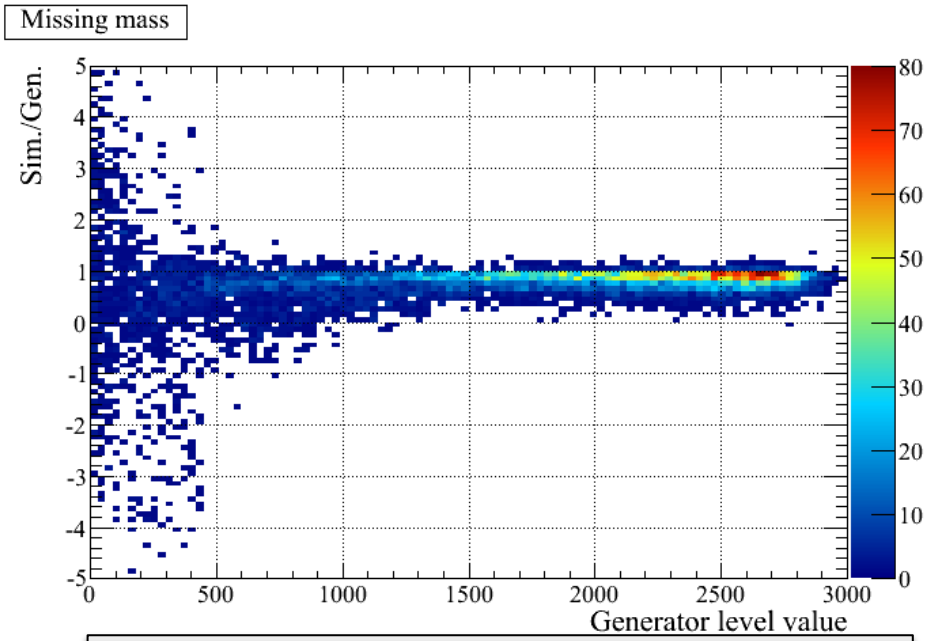
Ditrib. of smear coefficient for gen. data

Sim./gen. vs gen.

Case of missing mass (31 variables processed…)

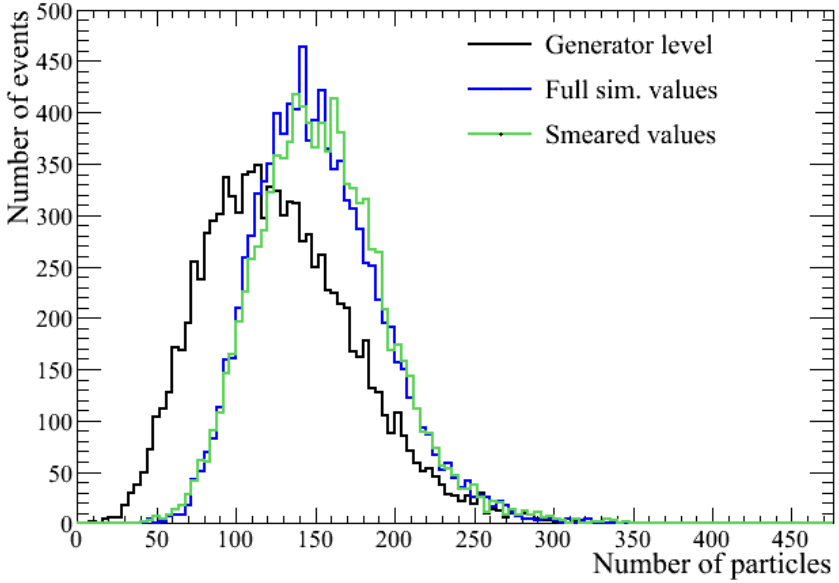


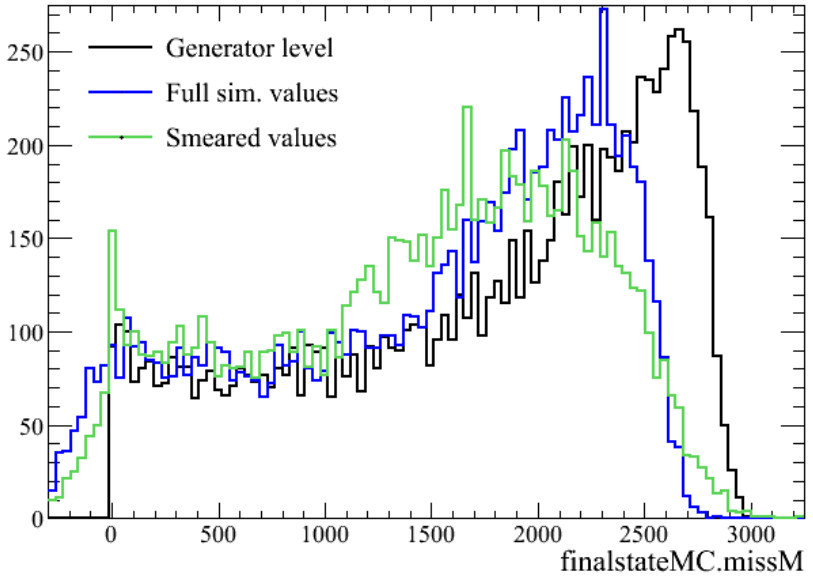
Measurement from full sim. data



Ditrib. of smear coefficient for gen. data

Impact on variable spectrum





- Result however not perfect but realistic
- Discrepancies tuned to be rather conservative

On going work

- Zp events very similar to ttbar events.
  - The smearing established can be applied.
  - “Full sim” Zp analysis can be performed
- But
  - Smearing defects
    - -> overestimate difference between signal and background
    - -> outstanding performance of TMVA !
  - 2 solutions: refine or extend .../…

Refine or extend

- Refinement:
  - Ameliorate all fits with thinner slices (TMVA regression ?)
  - Best long term solution
- Extend smearing
  - Apply to ttbar and ww gen. data
  - Expect lower performance
  - Quite straight forward

Plans

- Extended smearing seems the only possibility for a short timescale.
- Smeared Zp analysis can be wrapped up in one week or so from now
- Dead lines:
  - 20 May : submit thesis report (in one month!!)
  - 20 June : ICPP Istambul (2 talks foreseen)
  - 4 july : End of CDR studies
  - 20 july : thesis defence