Comments from Users - Marlin & al.

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Hamburg

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Outline

Overview

- Concrete suggestions from users
- Short term: What will needed for the next major production (this year) ?
- Medium term: What will needed for the TNR?
- Long term: What will needed for Real Data?

Suggestions from users

- Consistency checks of DSTs:
  - Momentum four-vectors should be space- or light-like; Masses ≥ 0; $E > 0$; Covariance matrixes positive definite; no NaN:s; ...
- Graphical viewer of GEAR files.
- Give in- & out-put files on the command line (with wild cards)
- Jet-finding & flavour-tag?
- More of everything !

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My un-ordered list of issues that should be solved

- Crossing angle:
  Was simply forgotten!
- Simulated primary interaction position:
  Presently, the primary interaction is fixed at (0,0,0).
- Known bugs fixed:
  Error estimate in tracking, BeamCal issues, ...
- The user requests Just mentioned

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- Timing information:
  For overlaying background from a different bunch-crossing. Also: $\Delta(t)_{iptoSET} \approx$ 4ns for straight track, but $\approx$ 11 ns for a 1 GeV p.
- Digitisation in trackers:
  Presently, sim-hits are just smeared. Would be good to have more realism. Need input from detector developers. Full program clearly *not* short term !
- BeamCal with background

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- Specialised generators:
  - PYTHIA/BDK/BDKRC for $\gamma\gamma$
  - BHWIDE for bhabha
  - TAUOLA for τ:s
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- Why?
  - Everybody uses Root at the end.
  - But one sometimes needs to be able to redo things done by Marlin:
    - Jet-finding
    - Particle ID
    - Even track fitting or Pandora
    - ...
- How?
  - Short-term: A (centrally produced ?) Root-Tree containing "all" DST information.
  - Create LCIO collection from root-tree, to be able to call a Marlin processor (typically SatoroJetFinder).
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Medium term

Alignment

An important issue we will have to affront for “The Next Report” is alignment:

- How do we re-align after a push-pull ?
- Can we align the large Si-detectors (SET, ETD) to the level needed for them to be useful?

Some part of the answer is software.

Medium term

Alignment

- Mokka and geometry description:
  - Different aspects:
    - Physical measurements
    - Measurements on beam-data
    - Feed correction factors to digitisation
    - Feed correction factors to tracking
    - Validation: Miss-aligned simulated detector
  - Ideally, this should be done in a coherent way.
  - Is the current geometry package up to the task to describe a real detector, with miss-alignments - local and global - sagging ?
  - How should the different aspects of alignment merge?

Fast simulation

- Needed to handle the $\gamma\gamma$ background: 30 nb !
- What data-model? Size !

We will need to think about this !

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Can our current software evolve into the software of a real detector with real data ? Or do we need to rethink?

LCIO:

- LCIO is a common framework ILD/SiD and CLIC.
- This should be maintained.
- But: Is LCIO adequate for real data ? Do we need LCIO V2 ?
  - Structural relations between objects of different classes ?
    - Dropping or invalidating objects.
  - Ambiguous solutions ?
    - The strip Si-detectors will yield left-right ambiguities. How to handle?
  - Direct access:
    - It would be preferable if LCIO is the data-model all the way to the physicists desk-top. How to accomplish this?

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MARLIN:

- Timing: Even using close to 100% of the DESY Tier1, we did not reconstruct at the speed that real data will arrive with.
- Clearly this was largely due to many un-optimised procedures, but...
- Are there orders of magnitude find in tuning?
- Don't count on Moore's Law !
- What is an event, anyhow?
  - A full bunch-train ?
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- A list of issues to be taken care of before the next major production was given.
- The issue of the geometry description in relation to alignment was raised.
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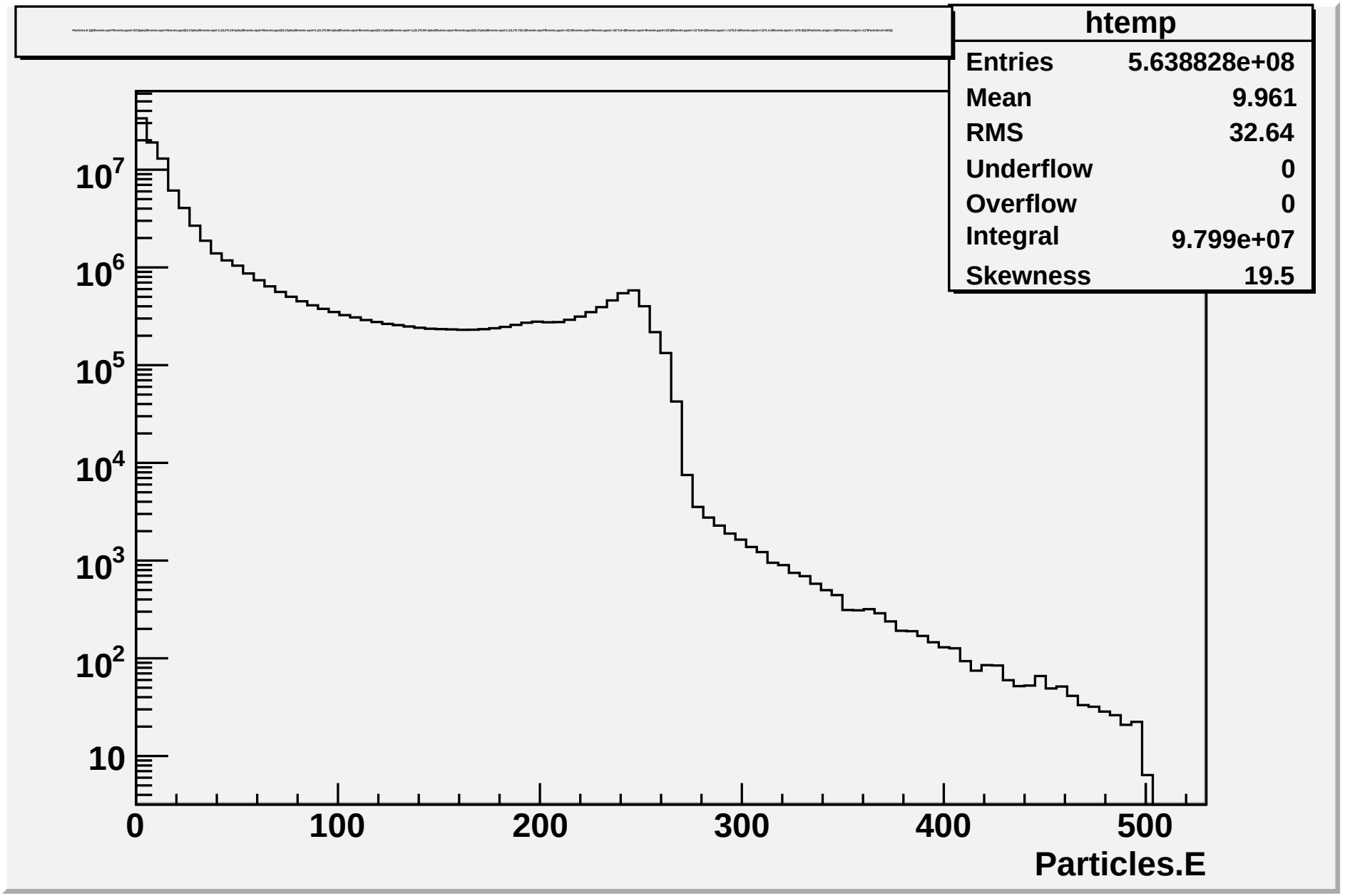
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Mean 9.961
RMS 32.64
Underflow 0
Overflow 0
Integral 9.799e+07
Skewness 19.5
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10^5
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10
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100
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Particles.E