Wednesday's meeting

- Discussion on software
- Guinea pig simulation
- Preliminary results on e^+e^- pairs
- First look at IP resolution

Simulation – reconstruction framework

- Detector model
  - FCCee_o3_v03 made by Emmanuel, based on CLIC_o2_v04
  - Pixel VXD, silicon strip (?) tracker (barrel & encaps)
- ILCSoft used
  - ddsim for simulation
  - Marlin for reconstruction

Software

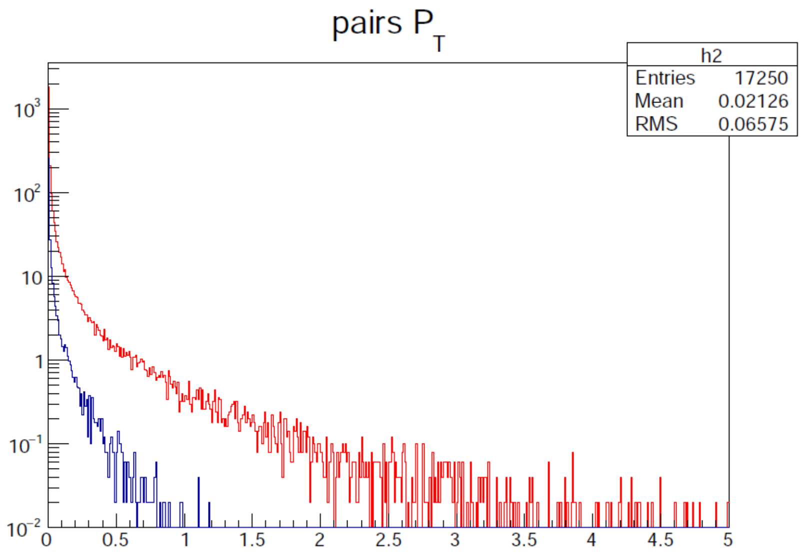
- FCC geometry description committed to central sw repository
  - svn co https://svnsrv.desy.de/public/ddsim/lcgeo/trunk
- DD4hep compatible spacepointbuilder
  - Motivated by the need to calculate hit densities
  - Avoid using gear (phased out)
  - Validated in ILD detector
- HitAnalysis / MC analysis
  - Simple Marlin processors, read sim/reco hit && MCParticle collections f
  - Produces root file with hit distributions etc

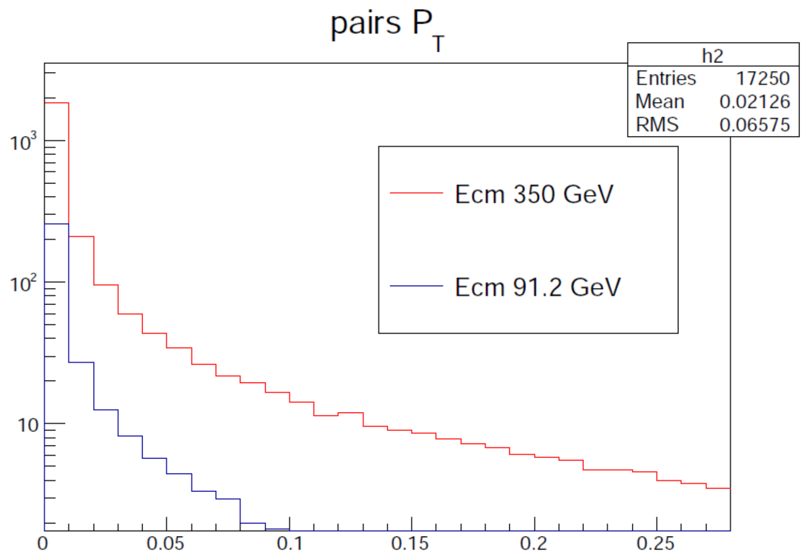
Pattern recognition

- We need at least some tracking
  - Conclude on acceptable occupancies
  - Acceptable material budget (e.g for beam pipe)
  - Plot IP resolution for various detector configuration
    - VXD inner layer radius
    - Material budget
    - B field etc...
- Is it our business to study/develop such tools?
  - We can start from CLIC pattern recognition tools
- Using a track cheater for the time being

Guinea Pig simulation

- ~200 BXs at Z peak (Ecm=91.2GeV) and ~100 BXs at top (Ecm=350GeV)
  - Top: 4000 pairs / evt, ~4 TeV of energy
  - Z: ~ 350 pairs / evt, < 500 GeV of energy



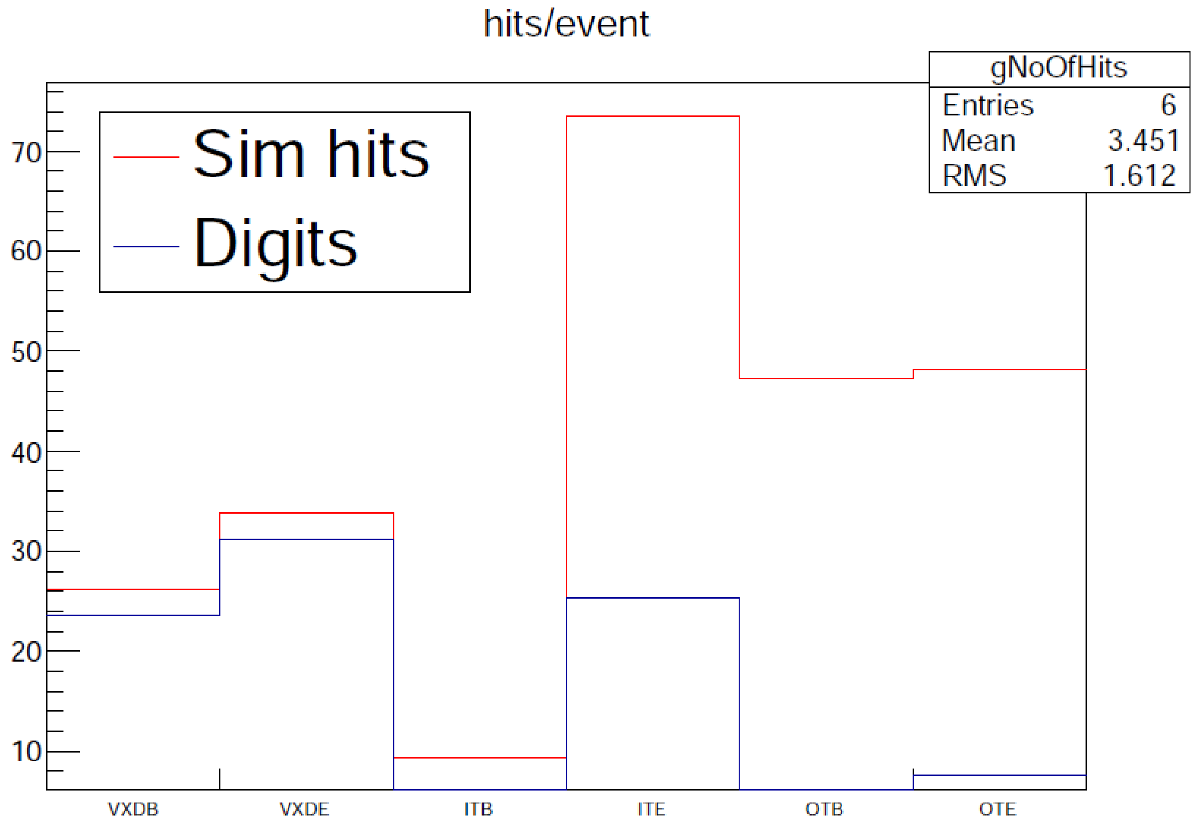


Normalised P_T distributions (GeV)

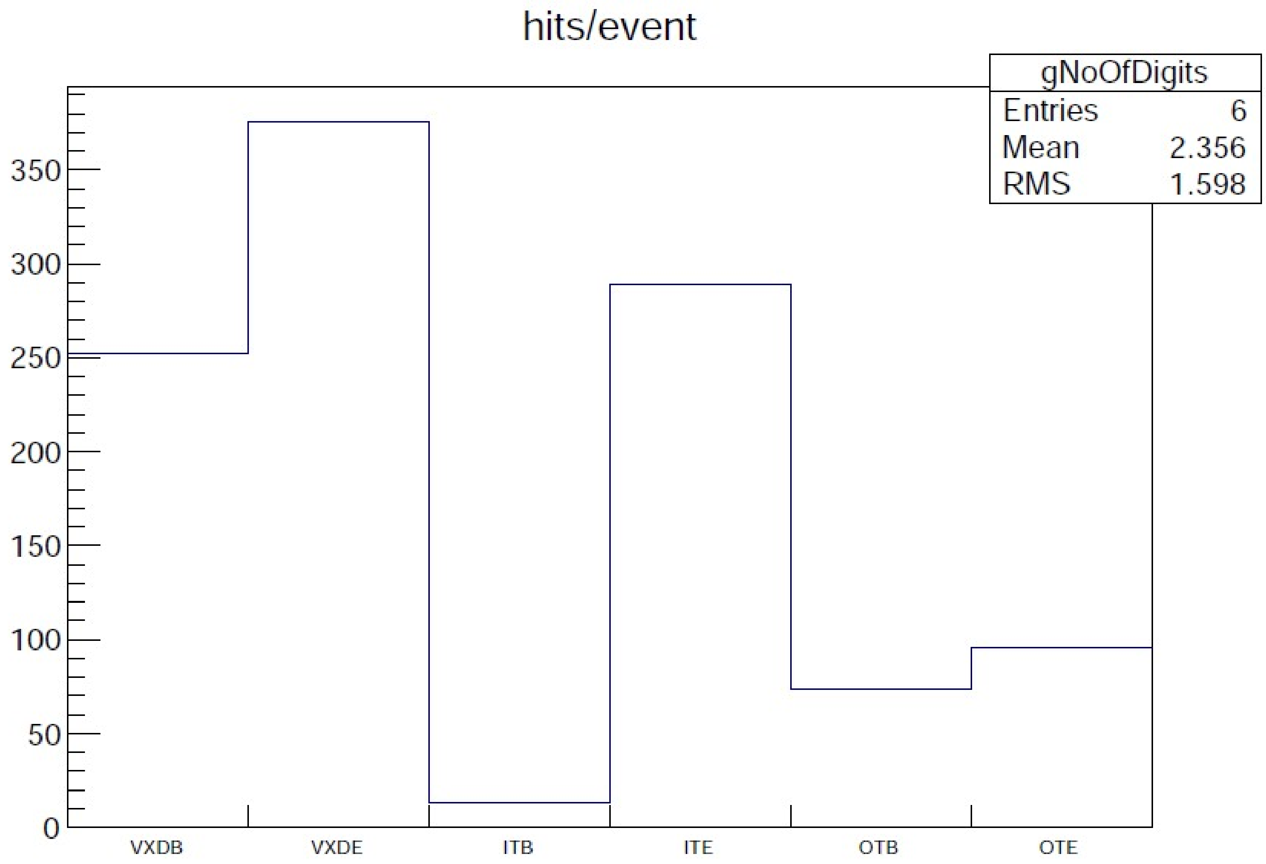
~13 MeV to reach 1st VXD layer (2T, r_{inn} 22mm)

First look at pairs

- Discrepancy observed between simulated and reconstructed hits
  - Seems that a large fraction of simhits are not on surface
  - For Z peak:



Digits / subdet, Ecm = 350 GeV



Hit densities at VXD barrel

- Ecm 350 GeV

  ~ 0.03 hits/cm^2/BX

  Bunch spacing 4μs

  - ✔ Should be ok

- Ecm 91.2 GeV

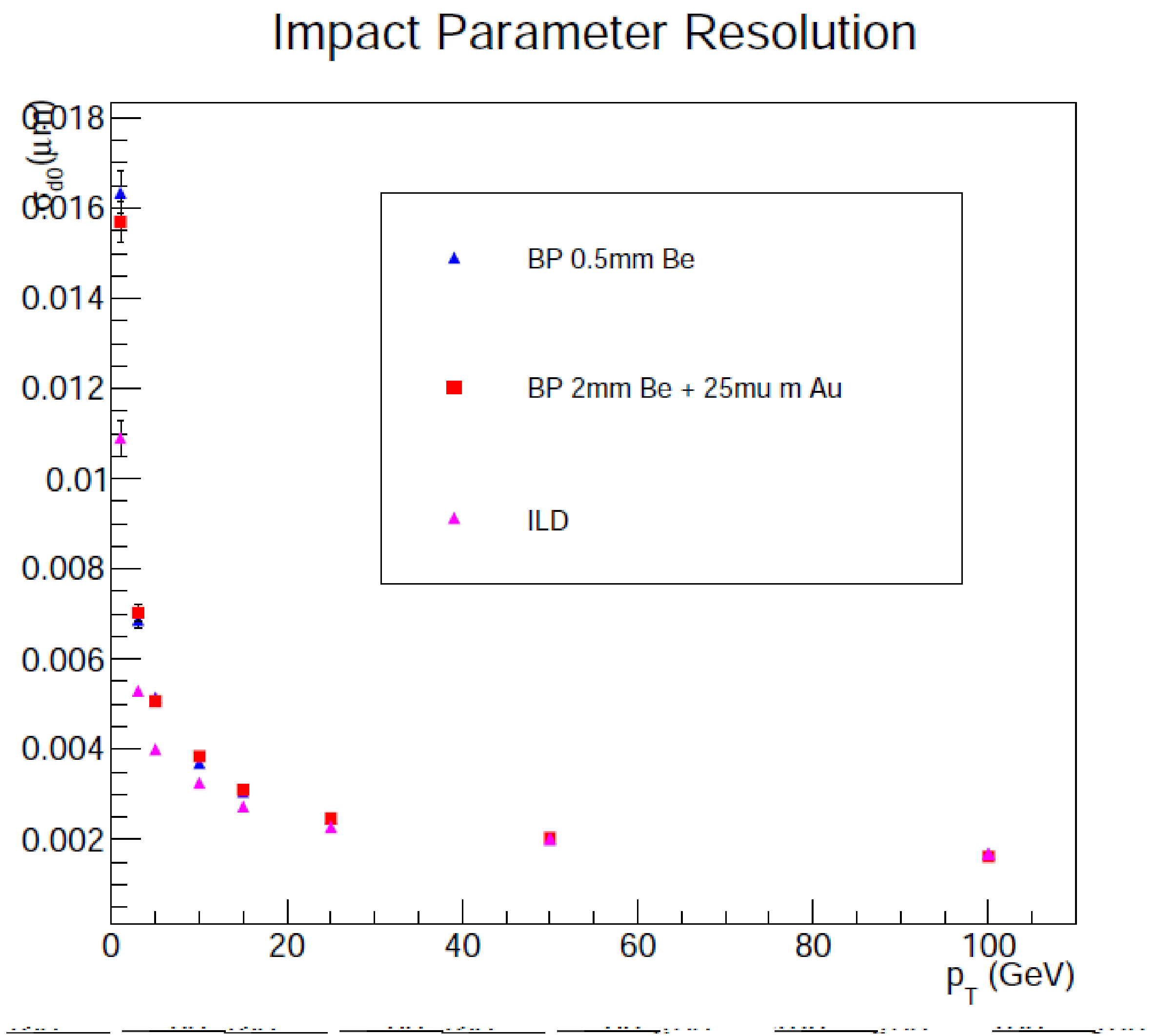
  ~ 0.003 hits/cm^2/BX

  Bunch spacing 2.5ns

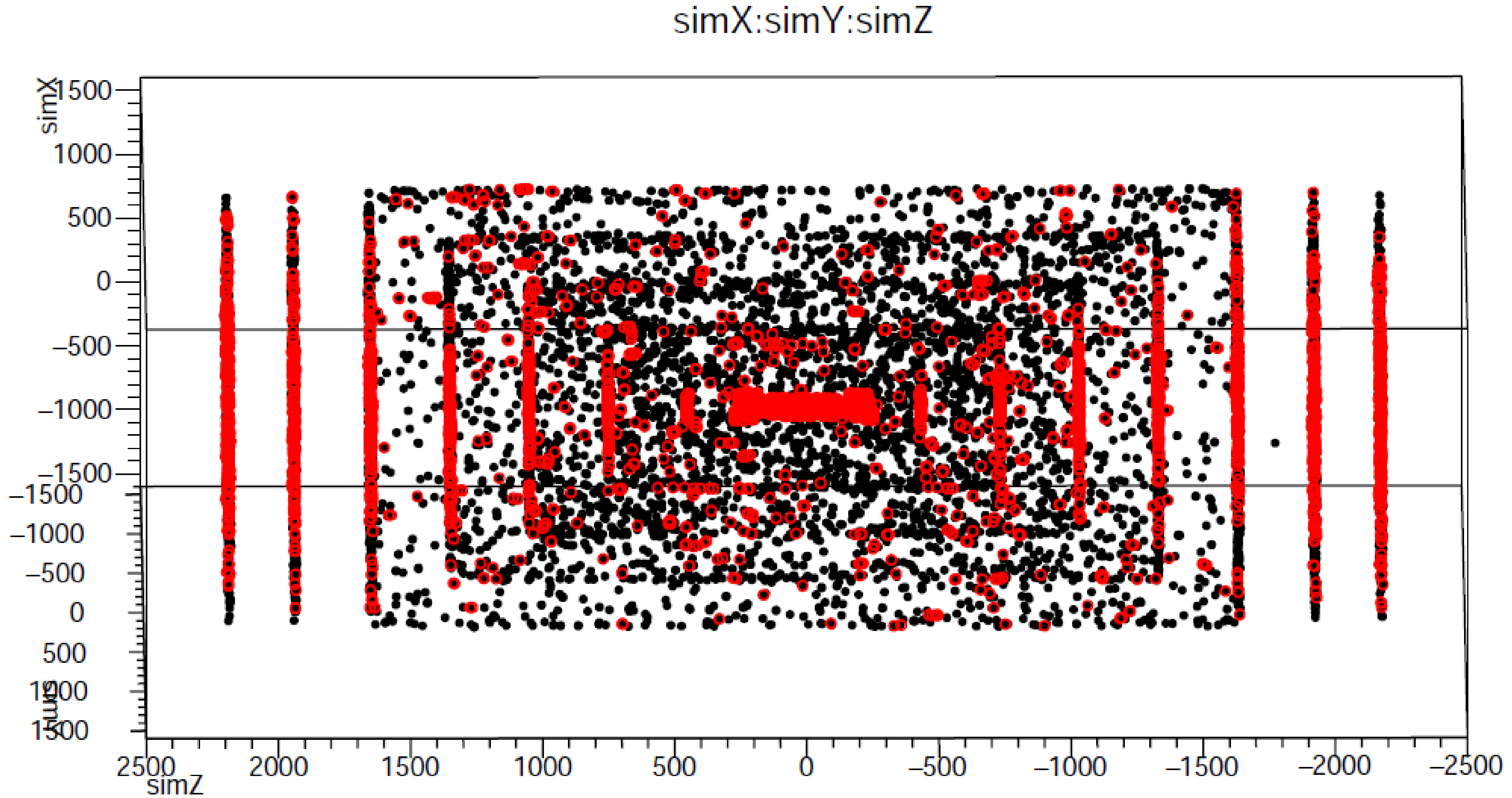
IP resolution

- Track cheater for pattern recognition
- Muons, FCC 2 BP options, ILD (shown c-tagging potential)

	R_{inn} (mm)	BP Mat (mm)	Spatial res. (µm)
FCC1	22	0.5 Be	3
FCC2	22	2 Be, 0.025Au	3
ILD	16	0.5 Be	3



Backup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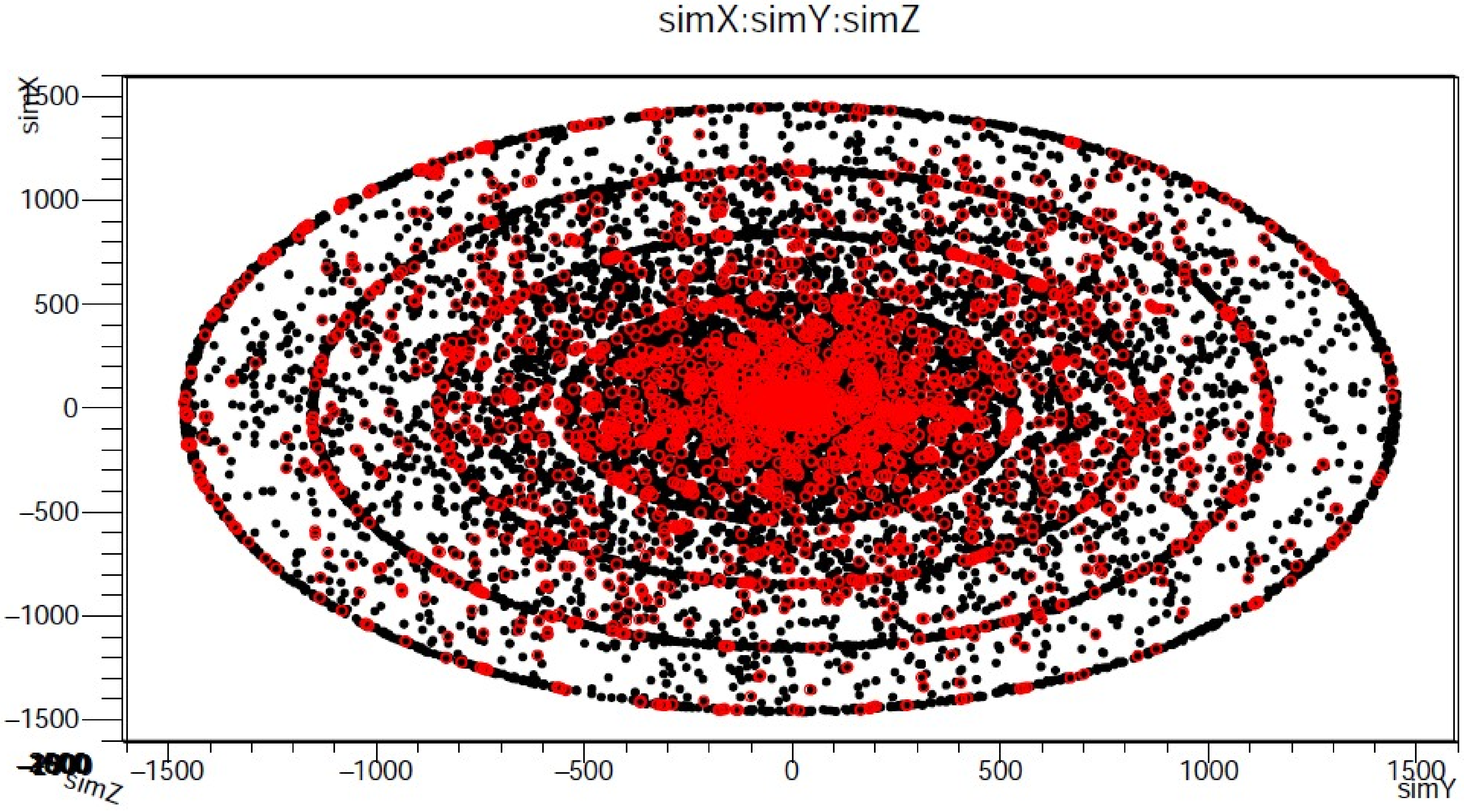
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