Simu. and Technical aspects

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Simulations

Fast simu. :

- Goals :
  - min bias spectra (E, p, y) of particles at AFTER energy
  - specific studies on «golden channels» => which ones ?
  - will allow to give the «cahier des charges» of AFTER detector
- People :
  - S. Porteboeuf (LPC Clermont)
  - L. Massacrier (Subatech)
  - C. Hadjidakis (IPN Orsay)
  - A. R. (CEA Saclay)

Full simu. :

- Goals :
  - very preliminary «draft» design of the detector
  - with CMOS pixels (vertex) and EmCAL à la CALICE (next generation EmCAL for ILC)
  - and ...
- People :
  - I. Hrivnacova (IPN Orsay)
  - F. Fleuret (LLR)
  - G. Musat (LLR)
  - V. Lafage (IPN Orsay)
  - A. R. (CEA Saclay)

Only O O for AFTER

- We agreed to use **only C++** based software
- Indeed, Fortran based software such as Pythia6 or Geant3 are (will) not (be) developed any more (in the near future)

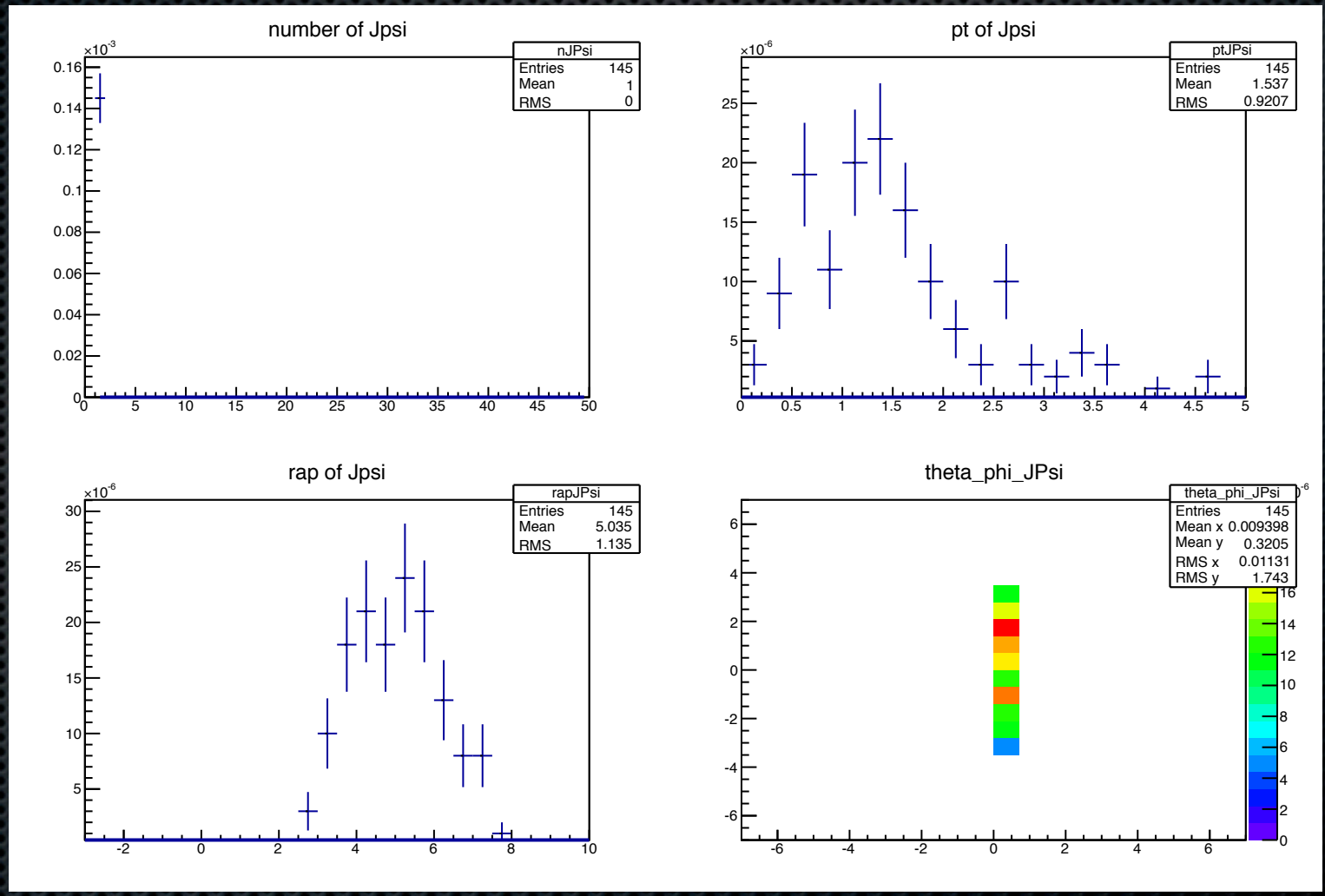
Fast simu.

- we started with Pythia8 which is already interfaced with ROOT
- other event generators will follow
- macros for min. bias simu. available and functional
- need list of «golden channels»: important particles + the wanted decay products

Thanks to S. Porteboeuf and L. Massacrier !

Fast simu.

- J/psi in 5M min. bias. events from Pythia8 (no decay yet)



Full simu.

Framework inspired from : MOKKA, ROOT

- MOKKA : Geant4 simulation tookit for all models of detectors for ILC, especially the **CALICE** EmCAL detector (original imaging approach to calorimetry, to «watch» the shower development, W +Si, ultragranular)

Thanks to I.Hrivnacova !

Why Mokka as A Start Point ?

From Gabriel Musat, LLR

- Use of MySQL database for geometry parameters
- "Scaling" - the users can modify the model's main parameters at run time
  - It makes easier to study different detector options, like TPC size, number of layers in calorimeters, etc.
- "Cooking" - the user can modify the model ingredients at run time
  - It makes easier to study different detector technologies, like analogical versus digital Hcal, etc. Allows easily switch between several models of detectors

Full simu.

Framework inspired from : MOKKA, ROOT

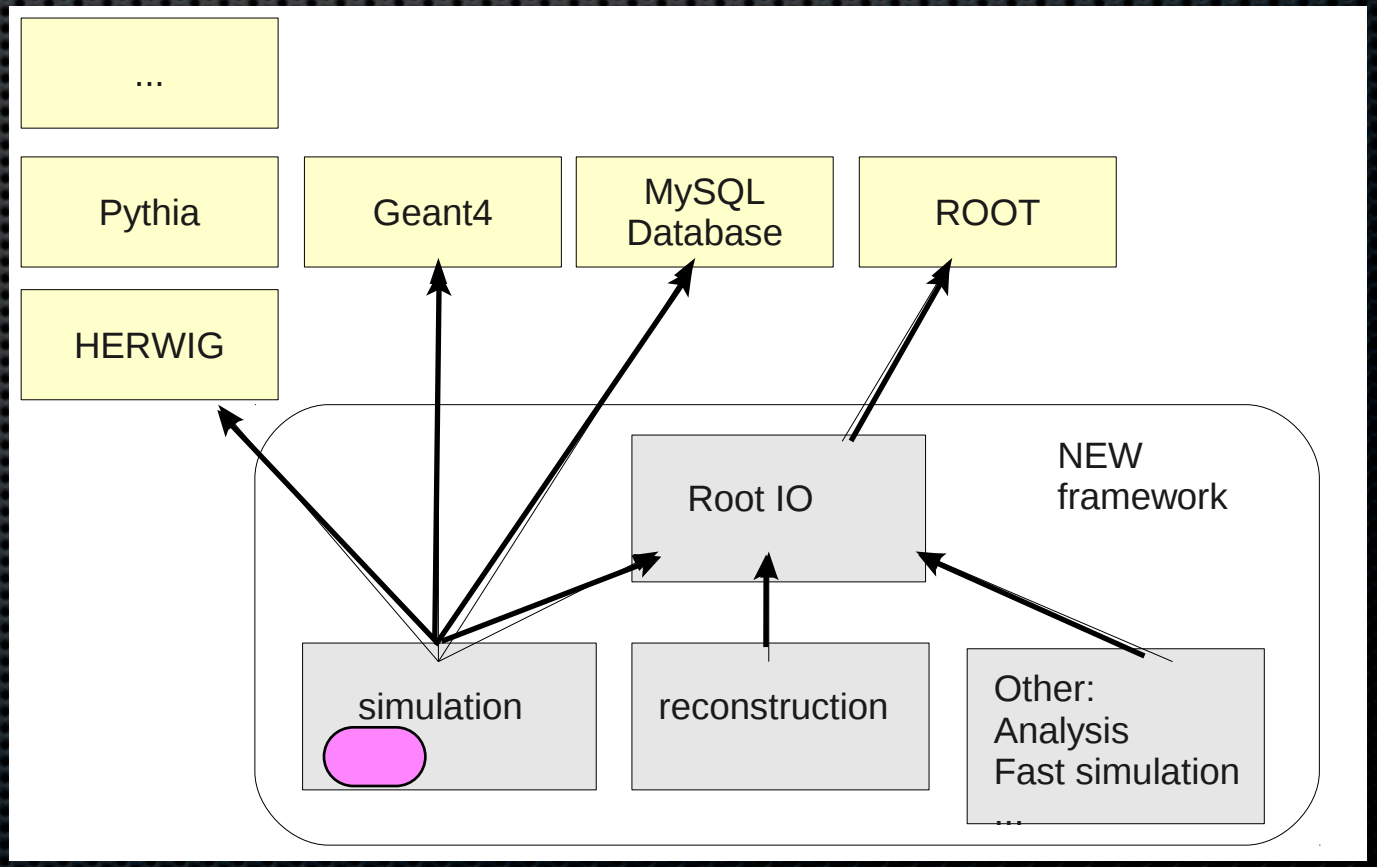
- MOKKA : Geant4 simulation tookit for all models of detectors for ILC, especially the **CALICE** EmCAL detector (original imaging approach to calorimetry, to «watch» the shower development, W +Si, ultragranular)
  - will probably switch from MySQL geometry database to more portable xml or event to root files
- why ROOT ?
  - many tools ROOT ⇔ GEANT4 for the description of the geometry/ mapping of the «detector» (sensitive elements)
  - many event generators are interfaced to ROOT
  - ROOT I/O , and straightforward data analysis

Full simu.

Framework inspired from : MOKKA, ROOT

- more robustness : clearly separate GEANT4 code
- generic framework, could be used to design other experiments/ detectors
- inherited/specialized module for AFTER detector
- inherited/specialized module for CHIC detector

Framework operational ! ... even if not final



I. Hrivnacova

Full simu.

Framework inspired from : MOKKA, ROOT

- will likely also benefit from AliROOT, especially
  - the interface to event generators
  - the implementation of the CMOS pixel forward vertex

Technical aspects

People :

- V. Chambert
- J. Engelfried
- N. Estrada
- M. C. Guclu
- J. P. Lansberg
- L. Massacrier
- S. Porteboeuf
- S. Platchkov
- ...
- A. R.

Topics :

- CMOS pixels not a viable candidate for tracking (only for vertexing) : cost, slow read-out because of a large number of channels
- current MicroMegas not a viable candidate for tracking, due to high current resulting from the «high» multiplicity environment
- but R&D group at CERN (and elsewhere?) working on MicroMegas for ATLAS for very high luminosity phase of LHC (LS3 horizon)
- RICH detector ~ 5 m at least needed given average muon (from J/psi) p_L ~ 60 (120) GeV depending on y_{lab}
- Forward part of the detector needs not be as sophisticated as the barrel part if most efforts are put on backward physics.

Technical aspects

Further steps conditioned by the results from fast simu.

Space constraints in the LHC cavern will be taken into account in the last step to give the final requirements for the detector.