



Full sim developments

A. Di Simone
INFN Tor Vergata



Outline

- Optical photon simulation
- Metadata handling
- EMC hits time binning

Optical photon simulation

- Thanks to Doug Roberts the optical photon simulation has reached a point where it makes sense to start using it in production
- On top of what already implemented in Bruno, it required a few minor tunings to BrnCore (me), and quite some work from the detector side (Doug)
 - All collected into a new package BrnPID
- Alejandro has kindly volunteered to assess the impact of the optical processes on CPU performance
- I'll need to further tune BrnCore to better handle optical photons
 - For example, G4 assigns to them a pdg code=0, that we don't like
 - Relatively low priority, though
 - No impact on CPU time expected

- Triggered by the request from EMC to have time bins in their energy depositions
 - In principle, one can use different binnings for different runs
 - Problem was how to store in the output file the details of the time binning used for a particular run
- Decided to implement a general (though fairly simple) metadata handling
 - Can save and retrieve any information, both from macro files and on the C++ side
 - All metadata is automatically saved to the output file
 - If multiple outputs are produced (like in the bg frames), the information is copied to each of them
- Documentation available in the usual wiki
 - http://mailman.fe.infn.it/superbwiki/index.php/Geant4_SuperB_simulation_main_portal/Metadata



Metadata example (particle gun)

Collection name='TList', class='TList', size=20
OBJ: TNamed BrnRelease FullSim/V0.0.3
OBJ: TNamed CLHEPRelease 2.0.3.2
OBJ: TNamed G4Release 9.3
OBJ: TNamed GDMLIFName Geometry_CIPE_V00-00-02/SuperB.Prod.gdml
OBJ: TNamed GDMLOFName NULL
OBJ: TNamed GenType Gun
OBJ: TNamed ROOTRelease 5.26
OBJ: TNamed SBArch Linux26SL5_x86_64_gcc412
OBJ: TNamed doBgFrame true
OBJ: TNamed doDetSurvey false
OBJ: TNamed doOptical false
OBJ: TNamed final_focus_Field_datacard Geometry_CIPE_V00-00-02/FinalFocus/MagneticElements.med
OBJ: TNamed macroFName singleparticle.mac
OBJ: TNamed macroOptFName NULL
OBJ: TNamed physicsList QGSP_BERT
OBJ: TParameter<double> GenSeed Named templated parameter type
OBJ: TParameter<double> LengthSvtL0 Named templated parameter type
OBJ: TParameter<double> RminSvtL0 Named templated parameter type
OBJ: TParameter<double> ThickSvtL0 Named templated parameter type
OBJ: TNamed EMC_time_bins 6 0 100 200 300 400 500



Metadata example (RadBhabha)

Collection name='TList', class='TList', size=16

OBJ: TNamed BbbremIPDataCard Geometry_CPIPE_V00-00-02_ShorterFF5mts/FinalFocus/IP_parameters.str

OBJ: TNamed GDMLIFName Geometry_CPIPE_V00-00-02_ShorterFF5mts/SuperB.Prod.gdml

OBJ: TNamed GDMLOFName NULL

OBJ: TNamed **GenType Bbbrem**

OBJ: TNamed doBgFrame true

OBJ: TNamed doDetSurvey false

OBJ: TNamed doOptical false

OBJ: TNamed final_focus_Field_datacard Geometry_CPIPE_V00-00-02_ShorterFF5mts/FinalFocus/MagneticElements.med

OBJ: TNamed macroFName NULL

OBJ: TNamed physicsList QGSP_BERT

OBJ: TParameter<double> **BbbremMinDE** Named templated parameter type

OBJ: TParameter<double> **BbbremPrescale** Named templated parameter type

OBJ: TParameter<double> GenSeed Named templated parameter type

OBJ: TParameter<double> LengthSvtL0 Named templated parameter type

OBJ: TParameter<double> RminSvtL0 Named templated parameter type

OBJ: TParameter<double> ThickSvtL0 Named templated parameter type

- Request was to be able to study evolution of energy deposits in time
- Implementation done by S. Tamaro (Tor Vergata)
 - User chooses the binning at runtime (in a macro file)
 - Bruno writes the binned information in hits as an array (TArrayD)
 - Existing integrated deposit left unchanged to smoothen the migration
 - Binning info written as metadata for offline analysis
 - Now waiting for first feedback from the detector expert (S. Germani)
 - Most likely, some minor tunings will be needed, but the implementation is rather mature
 - Last bunch of code committed earlier today
 - All changes limited to BrnEmc