GEMC 2.0 beta2

GEMC 2.0 Summary

- Automatic “true info”
- Automatic V(T) signal
- Simplified digitization
- FADC ready
- New banks, banks IO, automatic ROOT (coming soon)
- New field definitions
- Factory of factories
- Modular Physics List

New bank structure
4 GEMC outputs

DC (100, 0) ← "0" means it's a "mother bank"

- raw integrated infos (100, 1)
  - Identifier (101, 1)
  - pid (101, 2)
  - Edep (101, 3)

  etc
- digitized integrated infos (100, 2)
  - Identifier (102, 1)
  - ADCL (102, 2)
  - ADCR (102, 3)

  etc
- Voltage as a function of time (100, 3)
  - Identifier (103, 1)
  - Time (103, 2)
  - Voltage (103, 3)
- digitized multi hit infos (100, 4)
  - Hybrid (104, 1)
- Others: example, DC Cluster Bank(100, 10)
  - Identifier (110, 1)
  - Cluster Size (110, 2)
  - Cluster Mean (110, 3)

"True" info is Automatic.
No code required.

Simpler.

New bank structure
4 GEMC outputs

DC (100, 0) ← "0" means it's a "mother bank"

- raw integrated infos (100, 1)
  - Identifier (101, 1)
  - pid (101, 2)
  - Edep (101, 3)

    etc
- digitized integrated infos (100, 2)
  - Identifier (102, 1)
  - ADCL (102, 2)
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    etc
- Voltage as a function of time (100, 3)
  - Identifier (103, 1)
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  - Voltage (103, 3)
- digitized multi hit infos (100, 4)
  - Hybrid (104, 1)
- Others: example, DC Cluster Bank(100, 10)
  - Identifier (110, 1)
  - Cluster Size (110, 2)
  - Cluster Mean (110, 3)

Automatic.
Based on these PMT parameters:

- ➡ rise time
- ➡ fall time
- ➡ delay
- ➡ pedestal
- ➡ MeV to mV conversion factor

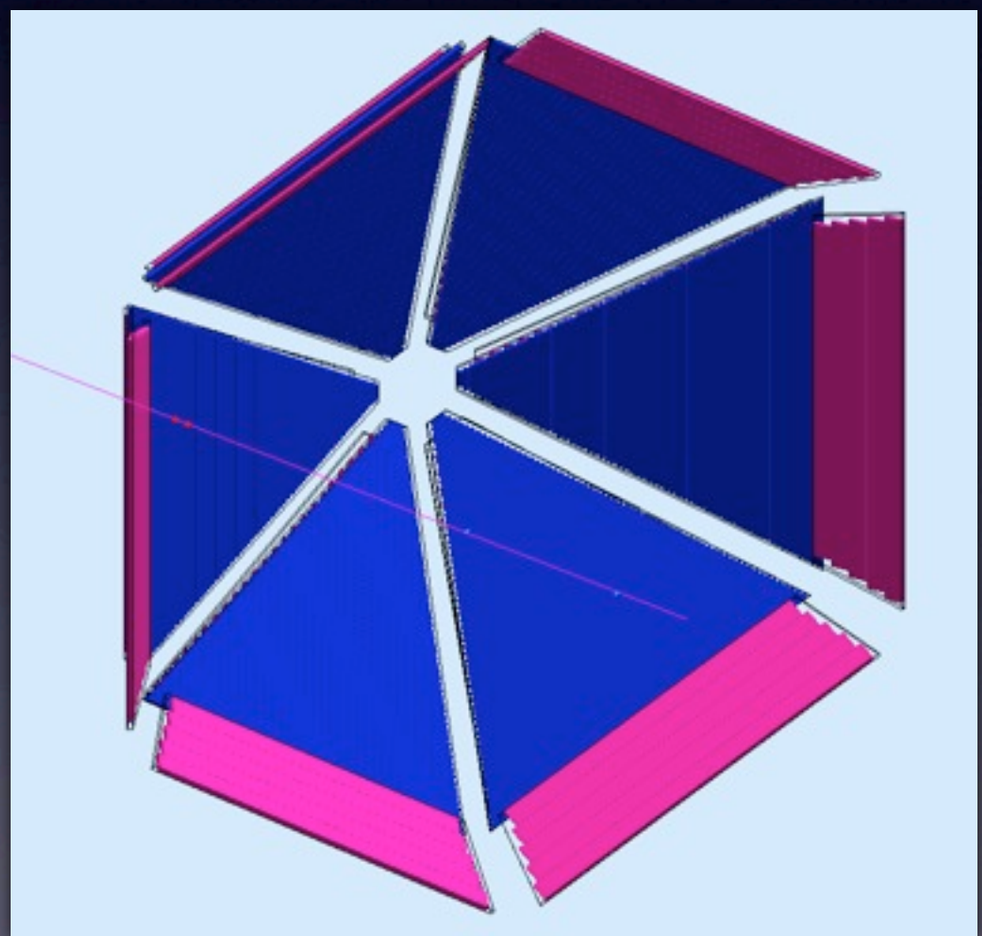
GEMC Voltage Signal Example

2.8 GeV pion, hitting FTOF 1a and 1b

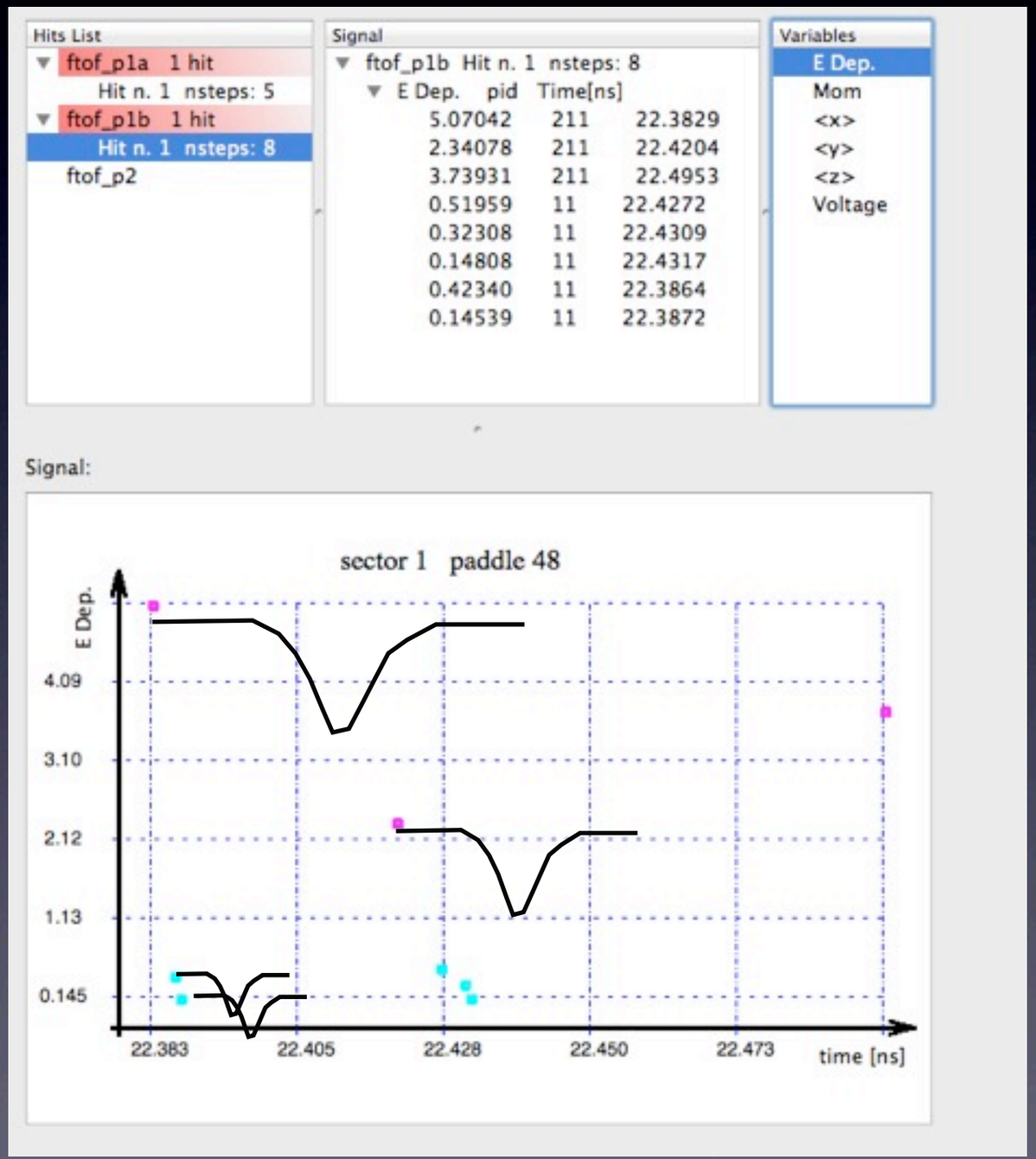
Rise time: 1ns
Fall time: 2ns

Delay: 50ns

1 MeV = 100 mV



GEMC Voltage Signal

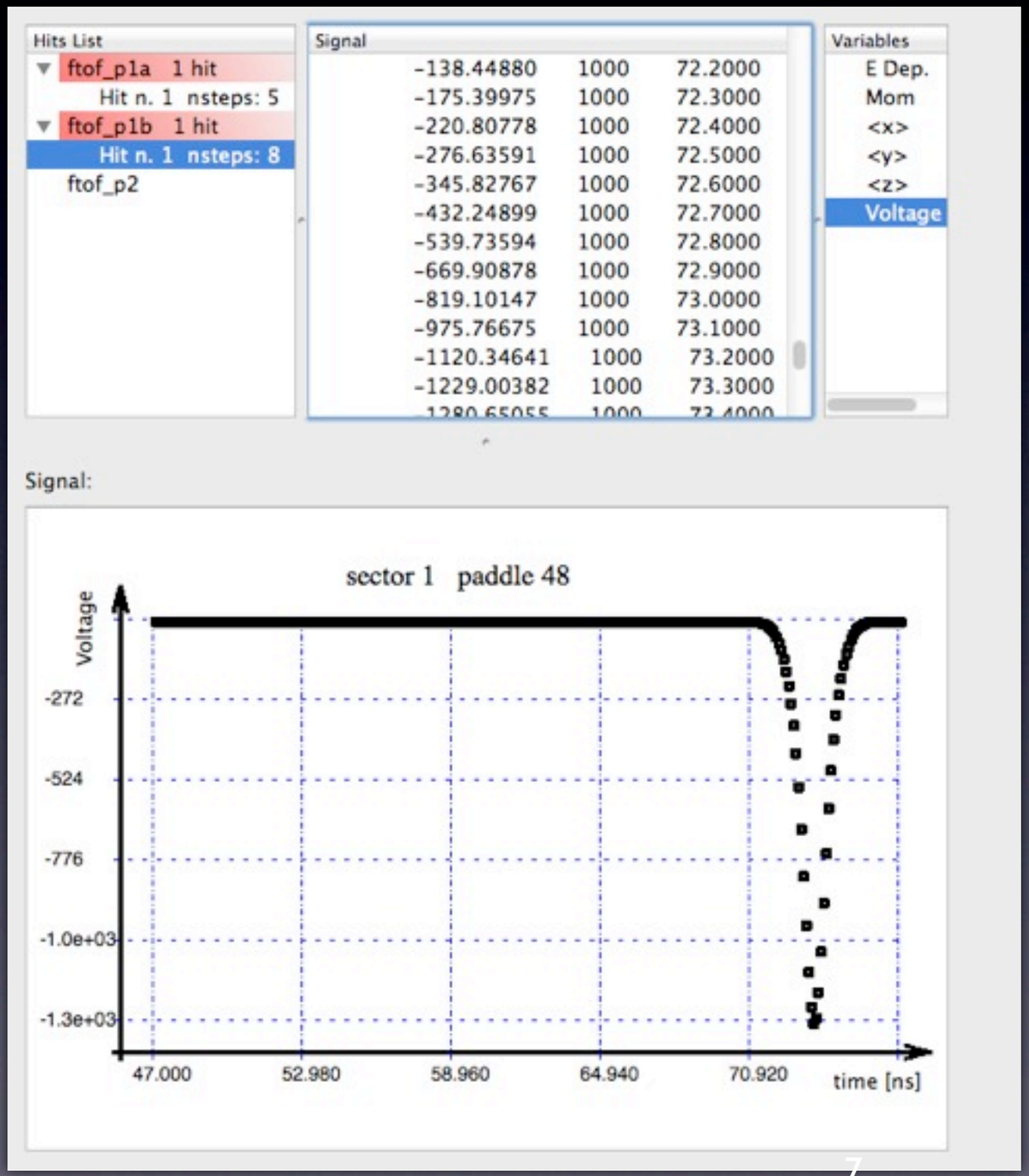


Time Resolution:
0.1 ns (can be detector parameter)

Total Signal is integral of all the step-signals.

Amazingly enough signal processing time is small.

GEMC Voltage Signal



Rise time: 1ns

Fall time: 2ns

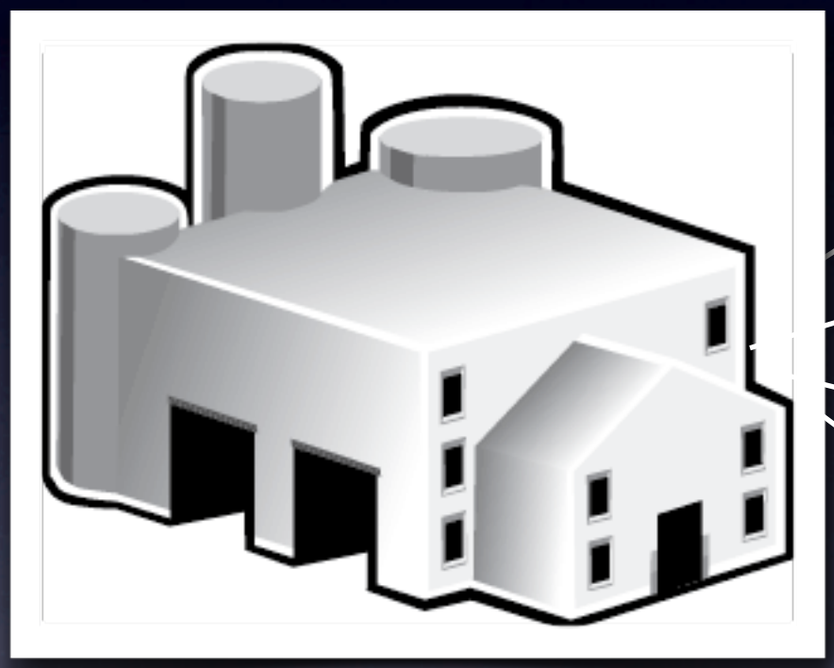
Delay: 50ns

1 MeV = 100 mV

Introducing mag field “online” definitions

```
<mfield>
       <description name="hps_frascati_magnet_field1" factory="ASCII" comment="Frascati Magnet 1 for HPS configuration"/>
       <symmetry type="dipole-y" format="map" integration="RungeKutta" minStep="1*mm"/>
       <map>
              <coordinate>
                     <first  name="longitudinal"  npoints="53"  min="-331.66" max="328.74" units="mm"/>
                     <second name="transverse"    npoints="5"   min="-34"     max="34"     units="mm"/>
              </coordinate>
              <field unit="T"/>
              <interpolation type="none"/>
              <shift z="-223.18" units="cm"/>
       </map>
</mfield>
   -331.66       -34   0.05124755204
   -331.66       -17   0.05230321363
   -331.66         0   0.05316693708
```

Introducing factories of factories



MYSQL

TEXT

GDML

CLARA

Introducing factories of factories

```
<detector name="DC12" factory="MYSQL" variation="mestayer" run_number="23"/>
<detector name="LTCC" factory="TEXT"  variation="rotated5deg" run_number="100"/>
<detector name="EC"   factory="CLARA" variation="original" run_number="1"/>
```

Modular Physics List

```
-PHYSICS="HADRONIC + <EM> + <HP> + <OPTICAL>"
```

Hadronic can be:

- CHIPS
- FTFP_BERT
- FTFP_BERT_TRV
- FTFP_BERT_HP
- FTF_BIC
- LHEP
- QGSC_BERT
- QGSP
- QGSP_BERT
- QGSP_BERT_CHIPS
- QGSP_BERT_HP
- QGSP_BIC
- QGSP_BIC_HP
- QGSP_FTFP_BERT
- QGS_BIC
- QGSP_INCLXX

EM can be

- STD
- EMV
- EMX
- EMY
- EMZ
- LIV
- PEN

`HP`: High Precision cross sections (e.g. thermal neutron, very low energy processes, etc)

`Optical`: Activate optical processes