Simulation Status

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Simulation Activities

- Future (see morning session)
  - FLUKA integration
  - Geometry Modeller
- Present
  - Geant4 physics evaluation (see morning session)
  - Preparation of PPR productions
    - PbPb
    - pp
    - special EMCAL production for US proposal
  - Beam halo studies
  - Merging

Outline

- Field Map
- EMCAL Simulation and MC Production
- Preparation for pp-production
- Beam Halo Simulation
- New in EVGEN
- Merging Status

New Field Map

- New detailed field map simulation performed by Marcello Losasso
  - L3 $|x|, |y| < 800$ cm; $|z| < 700$ cm
  - Dipole $|x|, |y| < 200$ cm; $700 < z < 1250$ cm
  - Outside Dipole $|x|, |y| < 350$ cm; $1250 < z < 1400$ cm
- For central solenoid field B = 0.2, 0.4 and 0.5 T
- New Class AliFieldMap to store maps in binary format
  - data/DipBxx.root
  - data/DipBxx.root
  - data/ExtBxx.roto (xx = 02, 04, 05)
- Used with AliMagFMaps

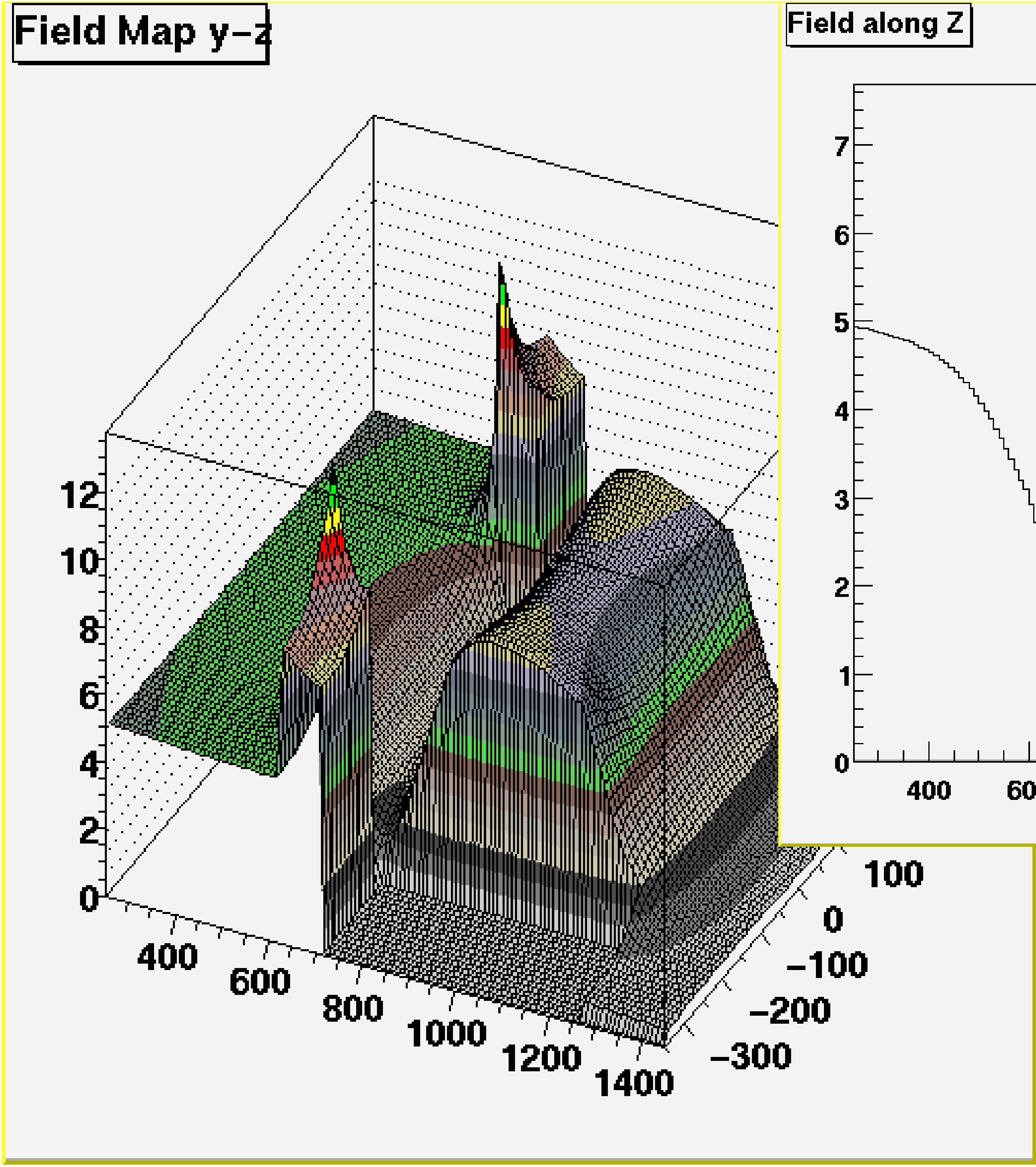
AliFieldMap

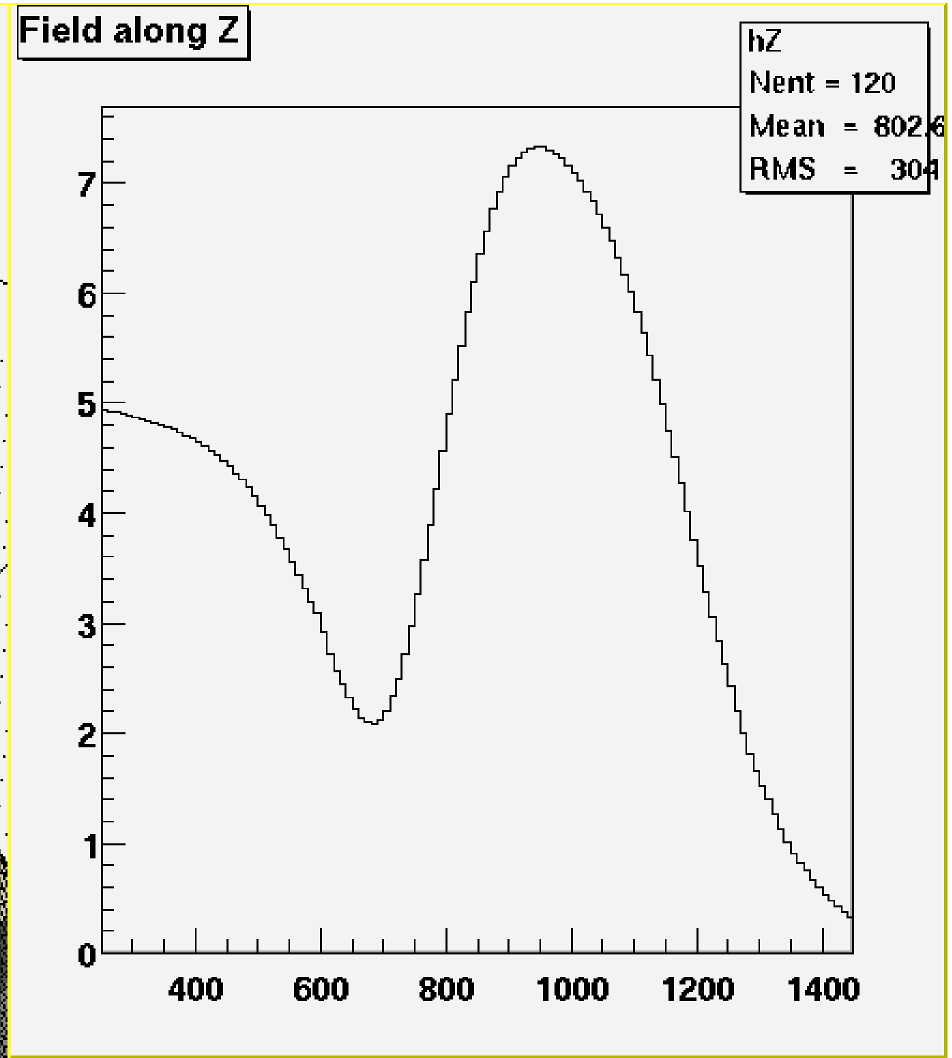
```
class AliFieldMap : public TNamed
{
  public:
    AliFieldMap();
    AliFieldMap(const char *name, const char *title);
    AliFieldMap(const AliFieldMap &mag);
    virtual ~AliFieldMap();
    void Copy(AliFieldMap &map) const;
    virtual AliFieldMap & operator=(const AliFieldMap &map);

    virtual void Field(Float_t *x, Float_t *b);
    Float_t Bx(const Int_t ix, const Int_t iy, const Int_t iz);
    Float_t By(const Int_t ix, const Int_t iy, const Int_t iz);
    Float_t Bz(const Int_t ix, const Int_t iy, const Int_t iz);
    Bool_t Inside(Float_t x, Float_t y, Float_t z);
    Float_t Xmin()  {return fXbeg;}
    Float_t Xmax()  {return fXend;}
    Float_t DelX()  {return fXdel;}
    Float_t DeliX() {return fXdeli;}
    Float_t Ymin()  {return fYbeg;}
    Float_t Ymax()  {return fYend;}
    Float_t DelY()  {return fYdel;}
    Float_t DeliY() {return fYdeli;}
    Float_t Zmin()  {return fZbeg;}
    Float_t Zmax()  {return fZend;}
    Float_t DelZ()  {return fZdel;}
    Float_t DeliZ() {return fZdeli;}
    void    SetLimits(Float_t xmin, Float_t xmax, Float_t ymin,
                      Float_t ymax, Float_t zmin, Float_t zmax)
    void SetWriteEnable(Int_t flag = 1);
}
```

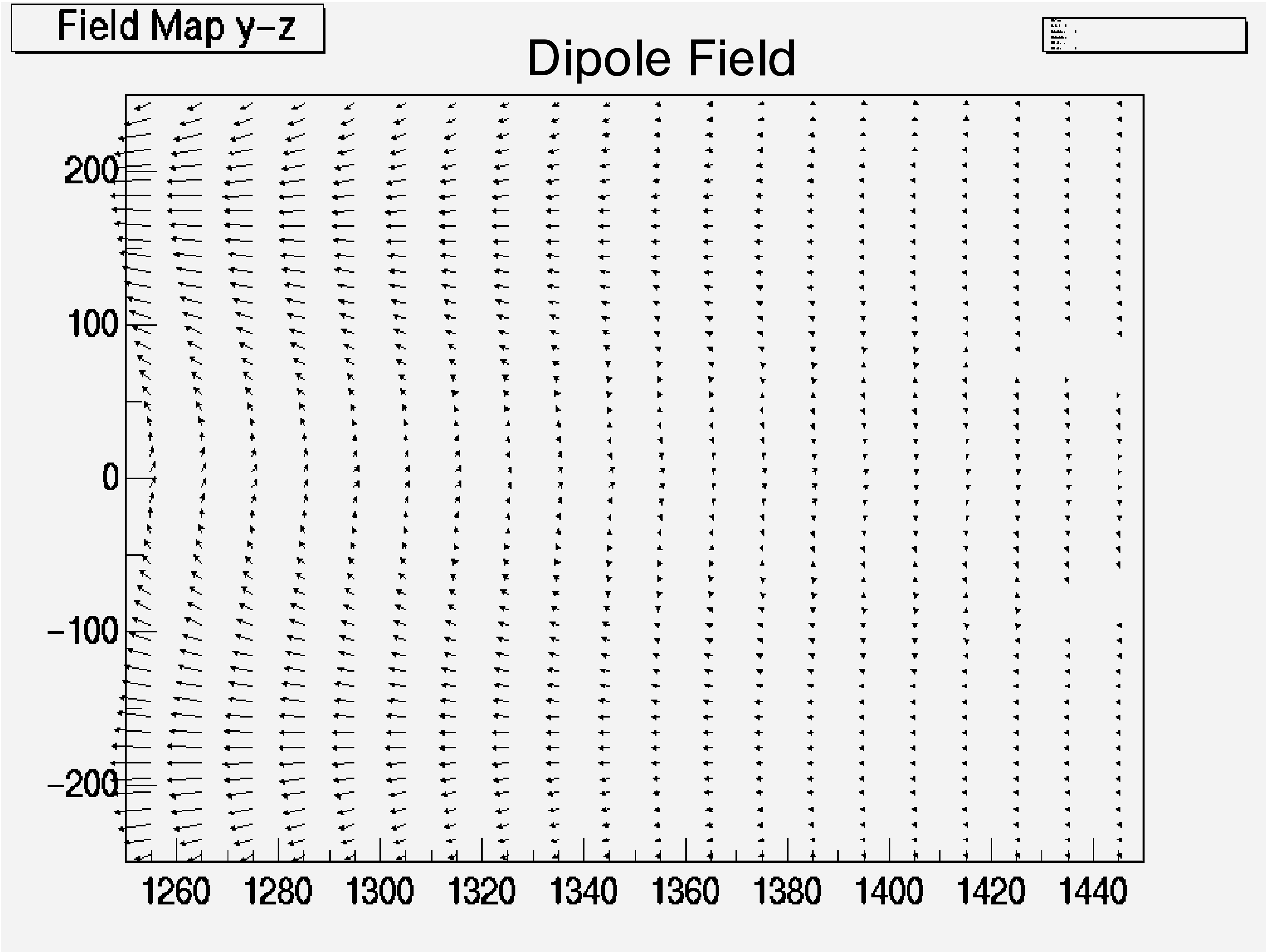
Configuration

```
AliMagFMaps* field = new AliMagFMaps(
     "Maps","Maps", 2, 1., 10., iField, iL3);
// ifield =    0 : 0.2 T
//             1 : 0.4 T
//             2 : 0.5 T
// iL3    =    1 : detailed L3 field
//        =    0 : constant L3 field
gAlice->SetField(field);
```





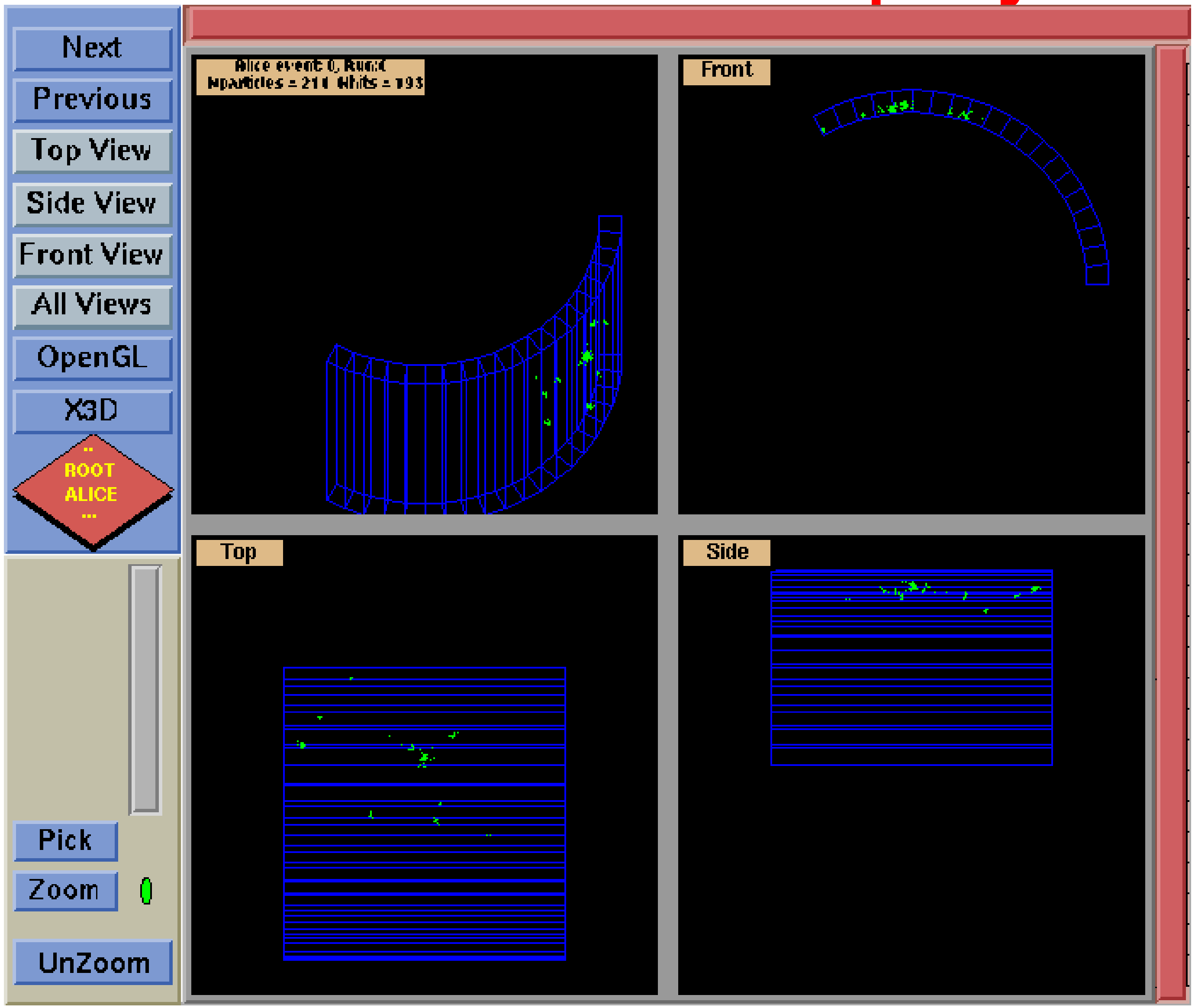
macros/plotField.C


Field Map y-z
Dipole Field
200
100
0
−100
−200
1260
1280
1300
1320
1340
1360
1380
1400
1420
1440

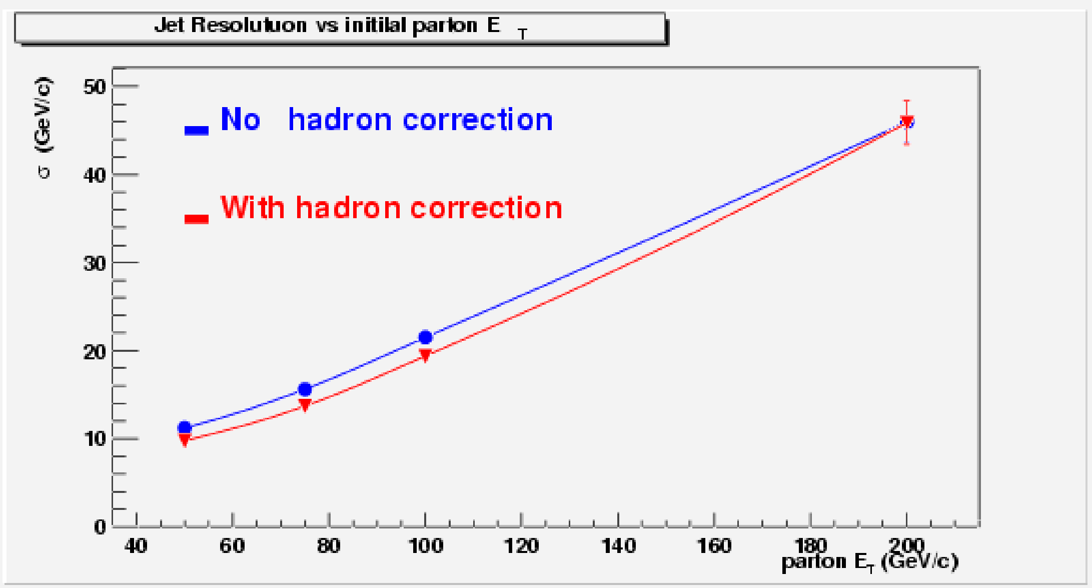
EMCAL Simulation and Production

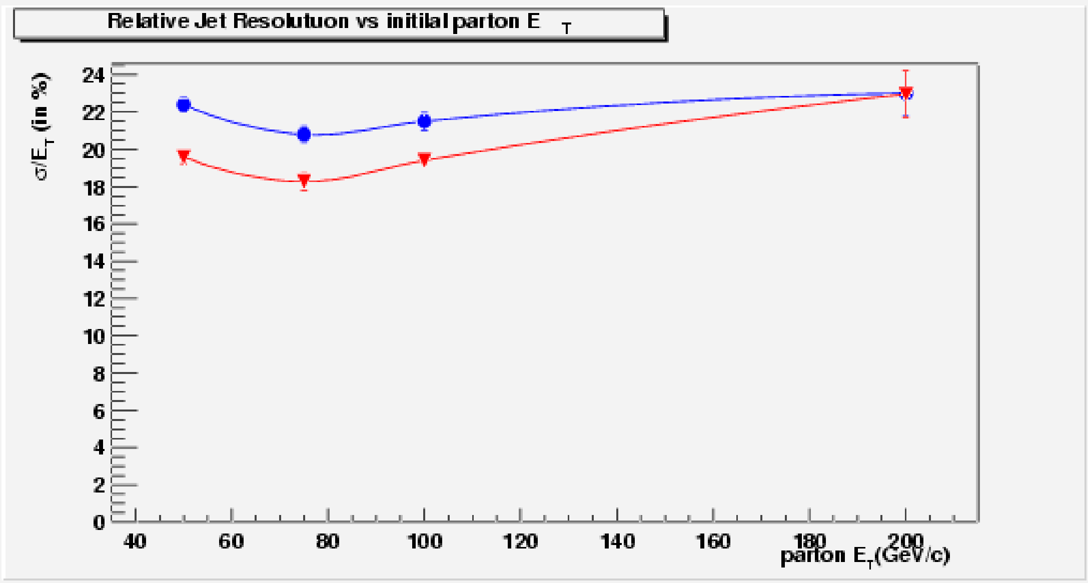
- EMCAL introduced into AliRoot
  - Coarse Geometry
  - Detailed Simulation
  - Hits, SDigits, Digits
  - Cluster reconstruction
  - Jet-Finder using fast TPC response simulation
- Production in preparation of US proposal
  - Underlying event (dN/dy = 4000, 8000)
  - jet-jet, gamma-jet (E = 50, 75, 100, 200 GeV)
- Implementation in a very short time (weeks) thanks to modularity of AliRoot !

EMCAL Event Display



First Jet Results (Preliminary !)



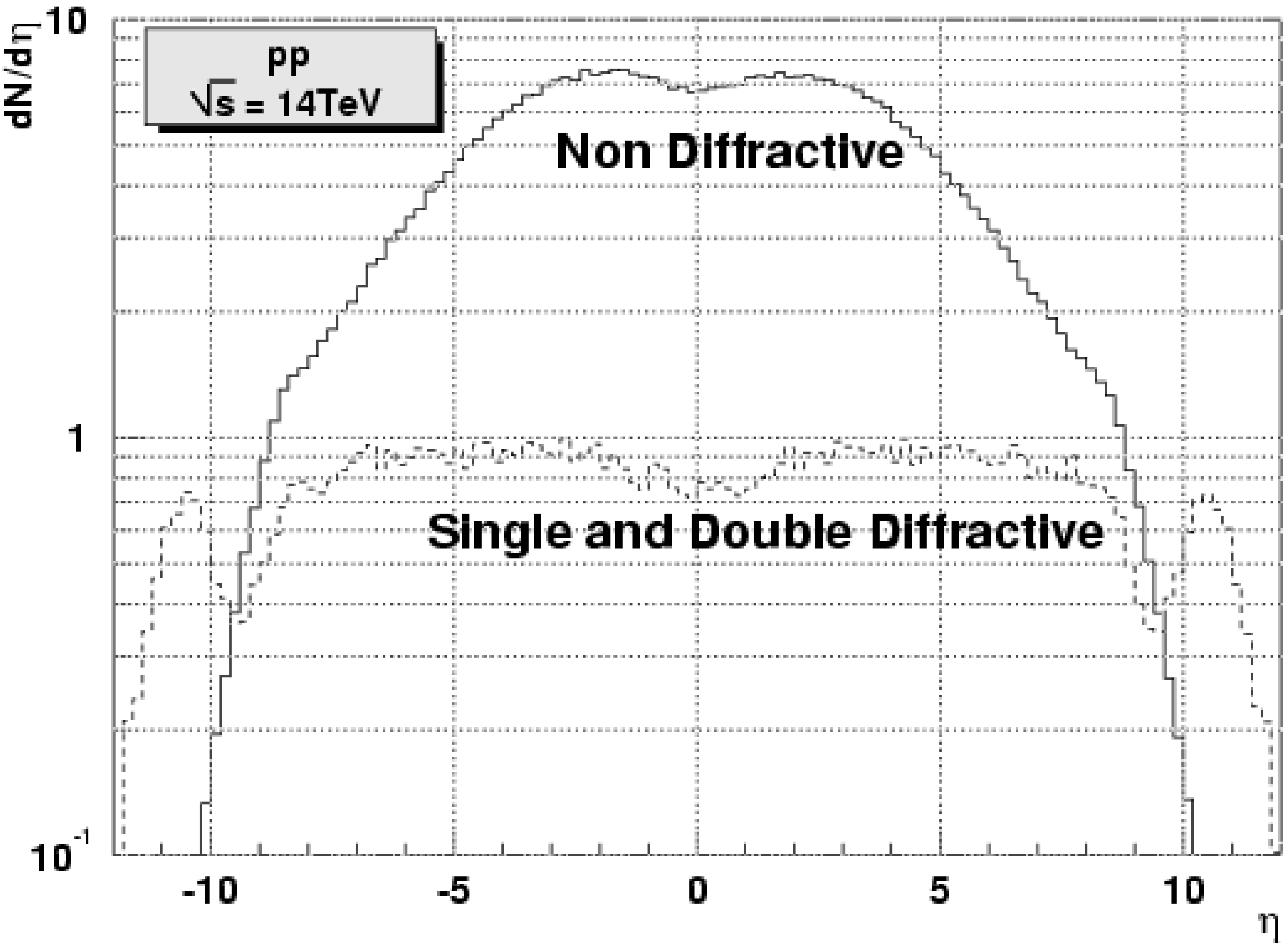


Preparation for pp Production

- pp Productions using Pythia
  - Minimum bias (M. Masera)
  - Hadronic charm (N. Carrer)

pp Minimum Bias

- Processes in Pythia
  - low-Pt non-diffractive scattering
  - single diffractive
  - double diffractive
- Multiple interaction parameters tuned to correctly reproduce central multiplicity and its energy dependence.


dN/dη
10
1
10^{-1}
pp
√s = 14TeV
Non Diffractive
Single and Double Diffractive
-10
-5
0
5
10
η

pp: Hadronic Charm

- Tuning of parameters to obtain distributions (pT and correlations) close to NLO results
- First production optimized for hadronic charm
- Later: production for semileptonic decays in full rapidity range (TRD and muon spectrometer)

Some Clean-up in AliGenPythia, AliPythia and AliGenMC

- Corrections after some test productions ...
  - Last particle was not read from stack because of change in TPythia6
  - pT < 100 GeV default cut removed from AliGenerator.h
  - Condition pz != E removed from rapidity calculation.
  - Memory leak in AliGenPythia::Generate()

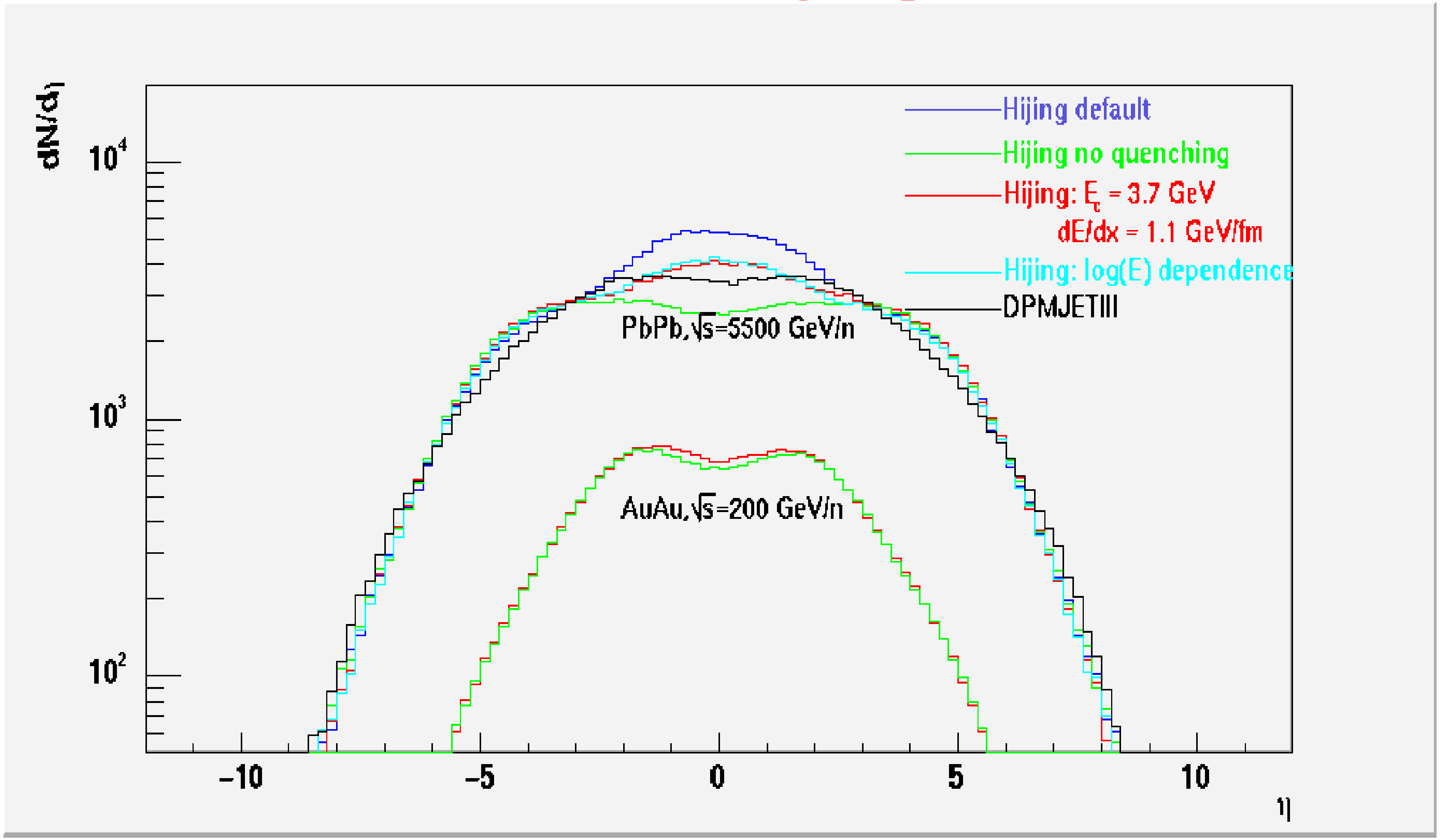
Beam Halo Simulation

- Generator: AliGenHaloProtvino
- Halo input particle with stat. weight for 1 interaction/s/m (data/ir.2.ring.one.b.10.m)
  - Get anonymous ftp address from me.
- Weight calculation with realistic weight using pressure table: LHC/gasPressure.dat

New in EVGEN (1)

- Base class AliGenReader
  - to be used with AliGenExtFile
  - Reader to adapt to any external file format
  - Main interface methods
    - NextEvent()
    - NextParticle
  - Realisations:
    - AliGenReaderCwn
    - AliGenReaderText
    - AliGenReaderTreeK
    - AliGenReaderEcalJets
    - AliGenReaderEcalHijing

New Quenching Options in AliGenHijing



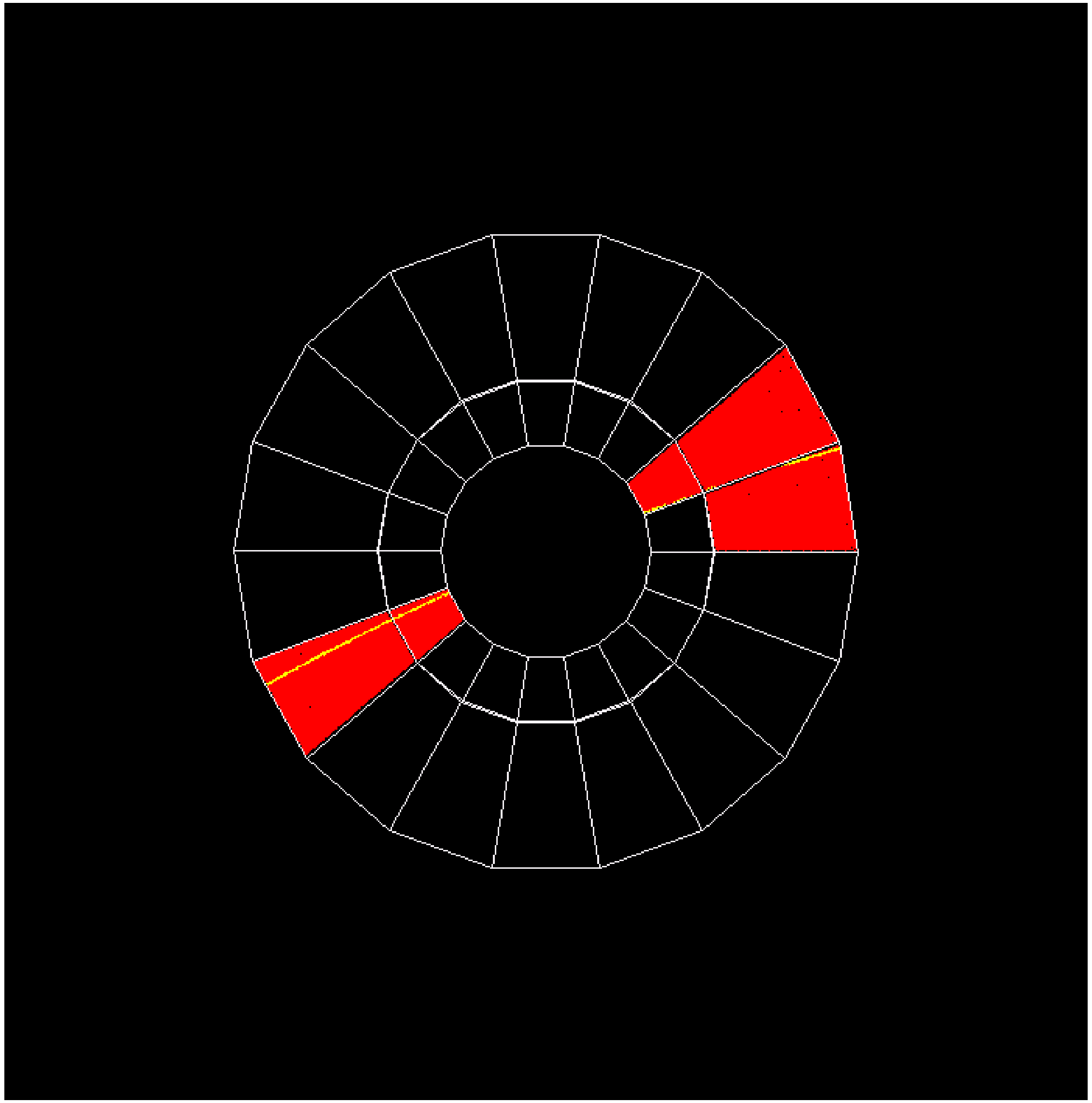
New in EVGEN (2)

- AliGenGeVSim (S. Radomski)
  - C++ version of STAR MevSim Code.

New in EVGEN (3)

- AliGenThetaSlice (J. Chudoba)
  - Generates n particles with in the same phi angle, varies theta in equidistant intervals

Digitization Status
(Jiri Chudoba)



File sizes

- bgr from run03 (2000 tracks/eta),
- signal J/Psi -> e+e- (0.-5 Gev), 200 events

- File sizes:
    - Hits, Kine, TPC sdigits .... 34 MB
    - + TPC digits (signal only) ... 112MB
    - + TPC digits (sig + bgr) ... 1045 MB
    - 5MB/event with merging

CPU Time

Real time on PIII/800 (cpu time very close to it), 200 events, PIPE+ITS+TPC

create sdigits	43 min	
merge	1h:50	
digits for s.	53 min	
	signal only	*sig. + bgr.*
clusters	13 min	54 min
tracks	73 s	51 min
sort	72 s	56 min

Latest News

- ITS merging: new code comitted on Friday (15.3.2002), uses SDigits
  - The previous implementation used only hits and was too slow 1hour/event
- TRD merging ready, but still has to implement ”region of interest” to be faster