Status of the Simulations for SPD

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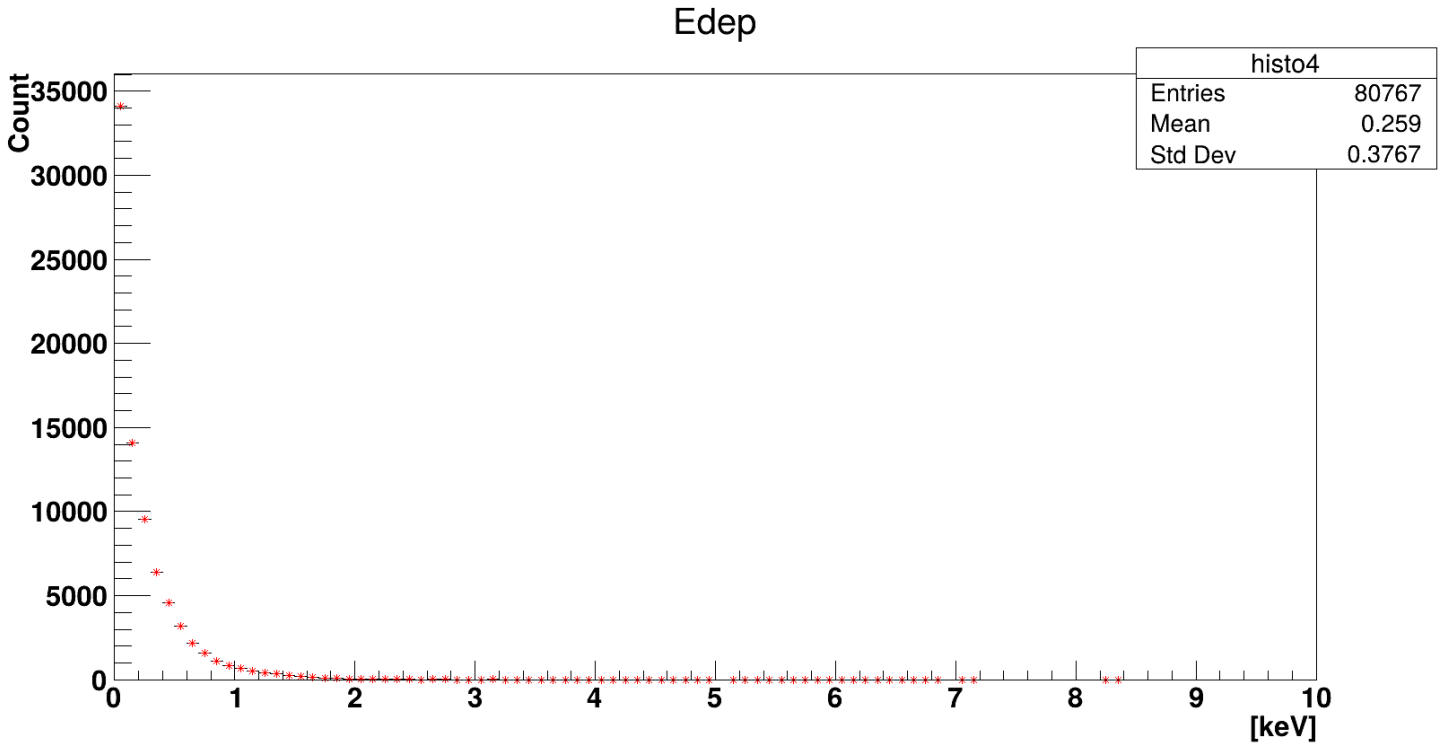
Outline

- Energy deposition inside of the STT
- Code for Electromagnetic Calorimeter
- RunManager for SAMPO
- Future Goals

Energy deposition inside of the STT



Total Energy deposition without selection of a Tube

Code for Electromagnetic Calorimeter

```
//Default Constructor
SPDelCalorimeterHit::SPDelCalorimeterHit()
: G4VHit(),fEdep(0.),fPos(),fTime()
{}

//Destructor

SPDelCalorimeterHit::~SPDelCalorimeterHit()
{}

//Copy Constructor

SPDelCalorimeterHit::SPDelCalorimeterHit(const SPDelCalorimeterHit &right)
  : G4VHit()
{
  fEdep = right.fEdep;
  fPos = right.fPos;
  fTime = right.fTime;
  //Check if needed Ekin and Momentum
}

//
const SPDelCalorimeterHit& SPDelCalorimeterHit::operator=(const SPDelCalorimeterHit &right)
{
  fEdep = right.fEdep;
  fPos = right.fPos;
  fTime = right.fTime;
  return *this;
}
```

...

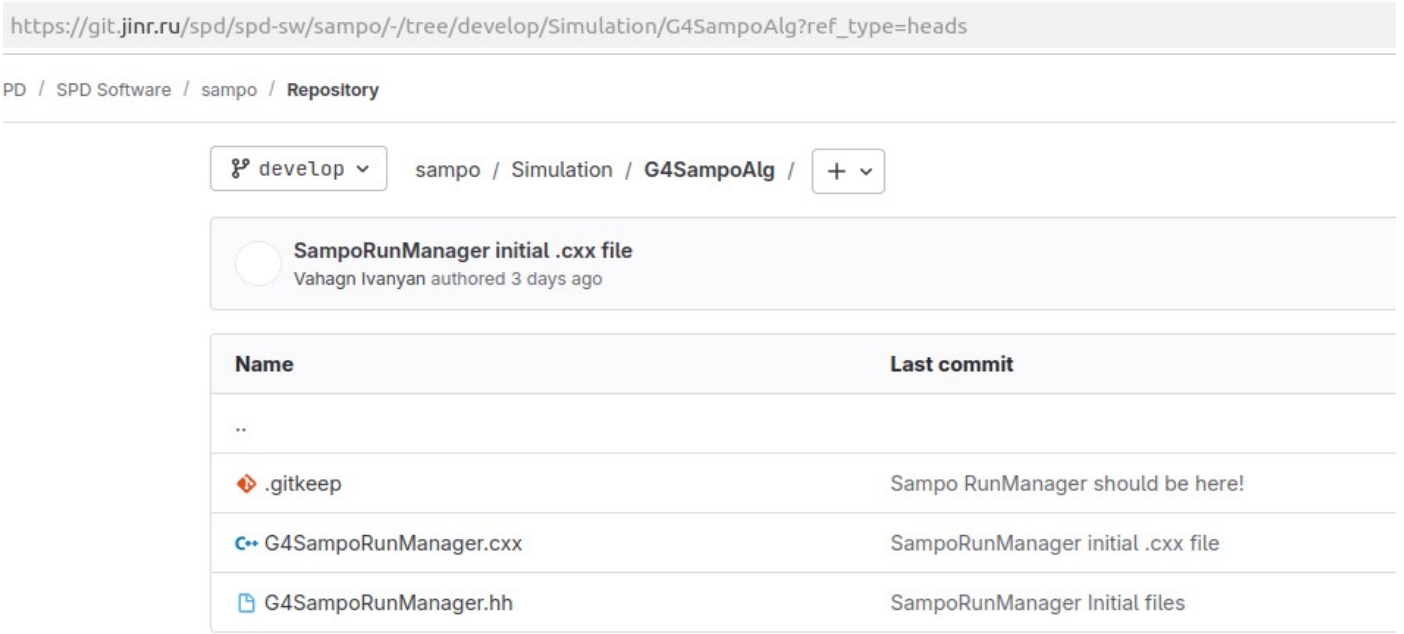
```
SPDelCalorimeterSD::SPDelCalorimeterSD(G4String name)
:G4VSensitiveDetector(name), felHitsCollection(0), fPositionResolution(0.)
{
  G4String HCname;
  collectionName.insert(HCname="hitsCollection");
  fPositionResolution = 150*nm; // check and change
}

//Destructor
SPDelCalorimeterSD::~SPDelCalorimeterSD()
{}

//Initialize (optional method of base class)
void SPDelCalorimeterSD::Initialize(G4HCofThisEvent*HCEca)
{
  static int hcIDca = -1;
  felHitsCollection = new SPDelCalorimeterHitsCollection(SensitiveDetectorName,collectionName[0]);// check
for gamma, e-/e+ in the GeoModel file or db file from Aytadj
  if(hcIDca<0)
  { hcIDca = GetCollectionID(0); }/// or use this to get the collection id:     hcID= G4SDManager::GetSDMp
>GetCollectionID(collectionName[0]);
  HCEca->AddHitsCollection(hcIDca,felHitsCollection);
}

//bool type ProcessHits function for steps inside sensitive volume
//mandatory base class method
G4bool SPDelCalorimeterSD::ProcessHits(G4Step*aStep,G4TouchableHistory*)
{
  G4double edep = aStep->GetTotalEnergyDeposit(); // energy deposition

  if(edep==0.) return false;
  //const G4double tof = aStep->GetDeltaTime();//time of flight spent by the current step
  //G4ThreeVector displace = step->GetDeltaPosition();//displacement

  //G4double aTime = aStep->GetPreStepPoint()->GetGlobalTime();//time since the beginning of the event
  //const G4VTouchable *aTouchable = aStep->GetPreStepPoint()->GetTouchable();
  //G4int copyNom = aTouchable->GetCopyNumber();

  SPDelCalorimeterHit* calHit;
  int namHit = felHitsCollection->entries();
  G4ThreeVector hitpos = aStep->GetPreStepPoint()->GetPosition();// position
```

...

Header and source code (partly) for a sensitive detector called SPDelCalorimeter

RunManager for SAMPO

Available via GitLab: https://git.jinr.ru/spd/spd-sw/sampo/-/tree/develop/Simulation/G4SampoAlg?ref_type=heads



- Some important parts for initialization of geometry, physics done…

Future Goals

- dE/x per STT tube
- Correction of the El. Calorimeter code
- Complete Pythia Integration (Partly done)
- SAMPO discussions