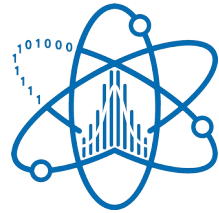




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Работа по GeoModel & Geant4 14.04.2025

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Plan

- Что такое GeoModel
- Что я ним буду делать
- Текущий статус

GeoModel

- GeoModel --- A user-friendly C++ Toolkit for HEP Detector Description (for simulation, digitization, reconstruction)
- The core packages only depend on these third-party libraries:
 - Eigen3, as the maths library (header-only)
 - SQLite, as the underlying format to store detector description data
 - fmt, as formatting library (header-only)

<https://geomodel.web.cern.ch/home/>

<https://gitlab.cern.ch/GeoModelDev/GeoModel>

GeoModel

- **GeoModelCore**
- **GeoModelIO**
- GeoModelExamples
- GeoModelTools: *Xerces-C, nlohmann_json*
- GeoModelVisualization: *Qt5, Coin3D, SoQt, nlohmann_json*
- GeoModelG4: *Geant4*
- FullSimLight: *Geant4*

GeoModel

```
// Define the chemical elements
GeoElement* Nitrogen = new GeoElement ("Nitrogen", "N", 7.0, 14.0067 *gr/mole);
GeoElement* Oxygen = new GeoElement ("Oxygen", "O", 8.0, 15.9995 *gr/mole);

// Define the materials

/ Air: Nitrogen + Oxygen + Argon + Hydrogen
double densityOfAir=0.001214 *gr/cm3;
GeoMaterial *air = new GeoMaterial("Air", densityOfAir);
air->add(Nitrogen, 0.7494);
air->add(Oxygen, 0.2369);

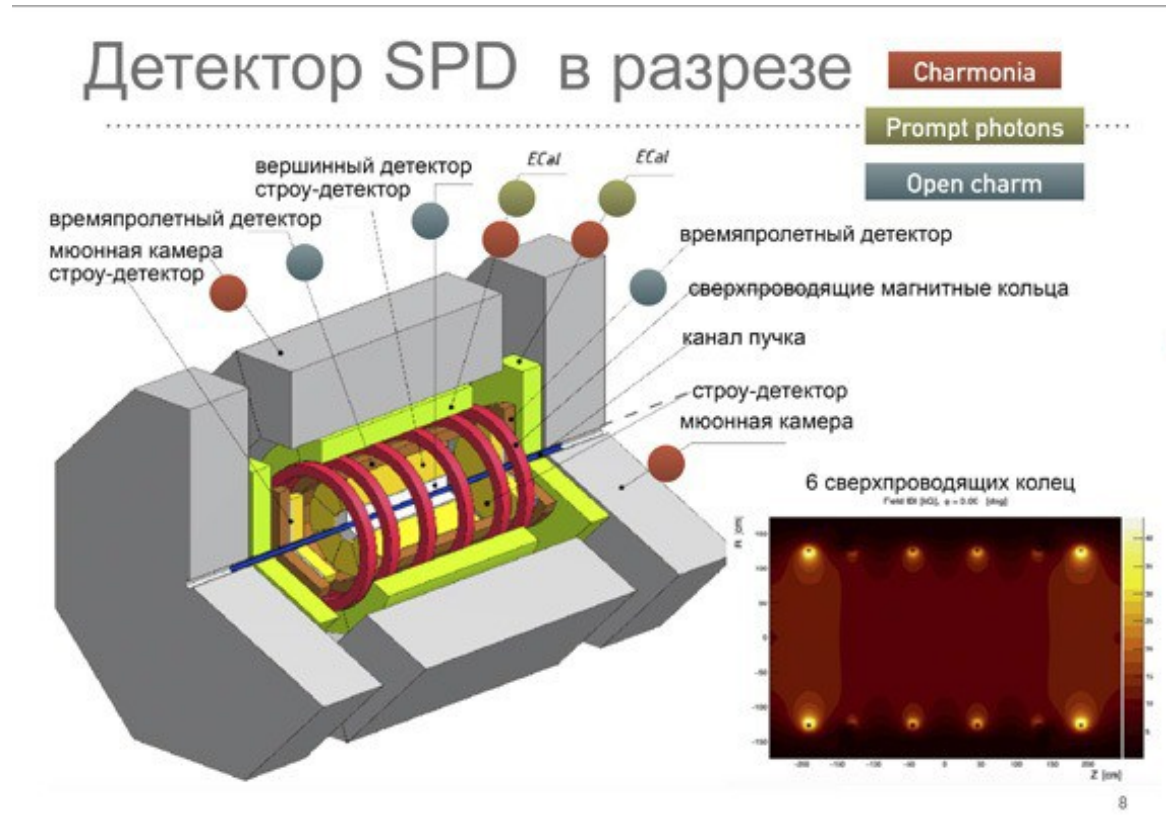
// the shape of the toy volume:
//-----//
const GeoBox *toyBox = new GeoBox(1200*SYSTEM_OF_UNITS::cm, 1200*SYSTEM_

//-----//
// Bundle this with a material
// into a logical volume:
//-----//
const GeoLogVol *toyLog = new GeoLogVol("ToyLog", toyBox, air);

//-----//
// ..And create a physical volume:
//-----//
GeoPhysVol *toyPhys = new GeoPhysVol(toyLog);
```

Что мы будем делать с GeoModel?

- Описание геометрии SPD
- Симуляция в Geant4
- Возможно использование для реконструкции



Текущий статус

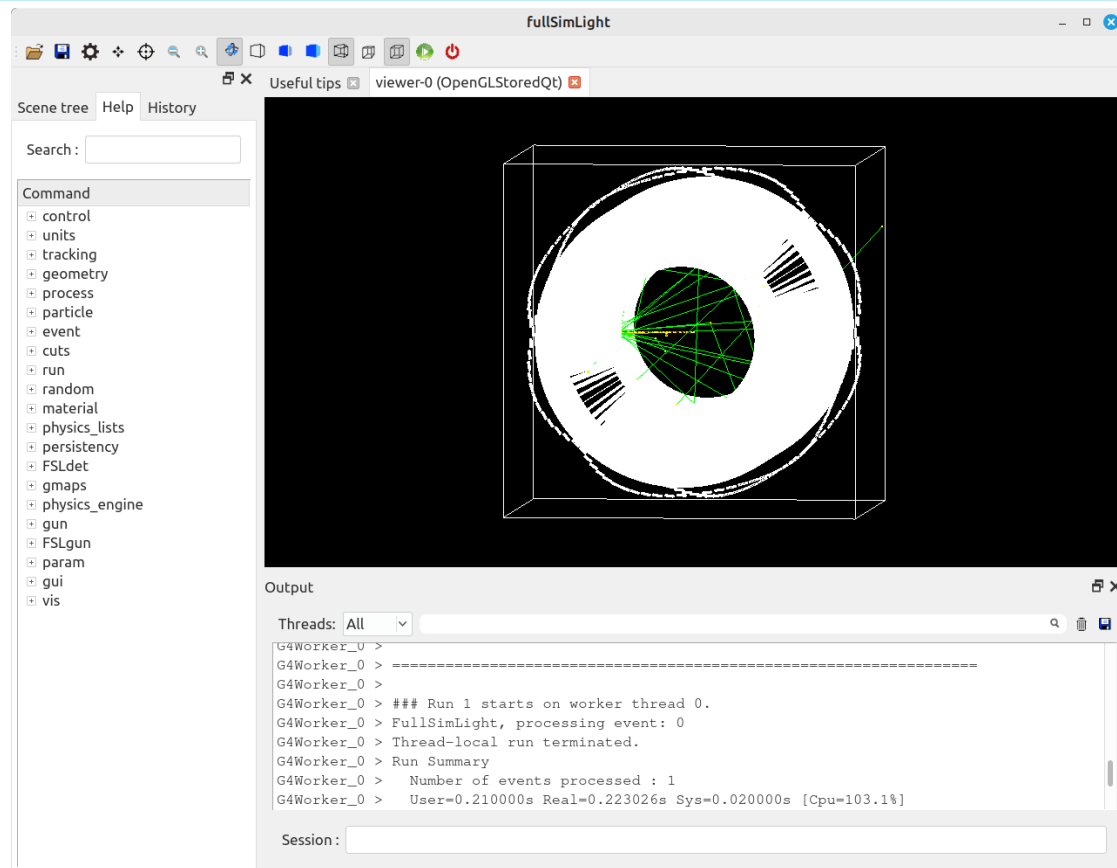
- Изучаю базовые классы GeoModel
- Работаю с fullSimLight
- Что сейчас сделано:
 - Освоена процедура записи и чтения
 - Создание плагинов
 - Добавил визуализацию Geant4

Config json

```
{
  "Generator": "Particle Gun",
  "Generator Plugin": "",
  "Geometry": "/home/rmakhman/dev_geomodel/build/GeoModelExamples/HelloToyWritePlugin/libHelloToyWritePlugin.so.SOVERSION",
  "HepMC3 file": "",
  "HepMC3 type of file": "",
  "Magnetic Field Plugin": "/home/rmakhman/dev_geomodel/install/share/FullSimLight/MagneticFieldPlugins/libUniformMagneticF",
  "Magnetic Field Type": "Plugin",
  "Number of events": 1,
  "Physics list name": "FTFP_BERT",
  "Pythia event input file": "",
  "Pythia type of event": "",
  "Regions data": [],
  "Sensitive Detector Extensions": [],
  "User Action Extensions": [],
  "g4ui_commands": [
    "/control/cout/prefixString G4Worker_",
    "/run/numberOfThreads 1",
    "/FSLgun/primaryPerEvt 1",
    "/FSLgun/energy 10.000000 GeV",
    "/FSLgun/particle e-",
    "/FSLgun/direction 1.000000 0.00 0.000000"
  ],
  "g4visui_commands": [
    "/control/verbose 2",
    "/control/saveHistory",
    "/run/verbose 2",
    "/control/macroPath /home/rmakhman/dev_geomodel/GeoModel/FullSimLight",
    "/control/execute vis.mac"
  ],
}
```

rmakhman@rmakhman-desktop:~/dev_geomodel\$./install/bin/fullSimLight -c tmp.json -v

GeoModel G4Vis mode



Спасибо за внимание!