Charge2Energy tutorial

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The following set of slides explains how to obtain a brio file containing real data with calibrated calorimeter hits using Charge2Energy module. We will start with a brio file containing only UDD data and end with a brio file containing a CD bank with measured energies. For basic information about data banks and data processing chain see for example docDB #5684. I also recommend reading the "Charge2EnergyModule" section at https://github.com/konarfil/CalibrationTools.

Initial setup

1. Login into your account on CC-Lyon

2. Load Falaise

- the current Falaise release (5.1.2) does not contain pcd2cd module which we need -> we load unreleased version:

```
source /sps/nemo/scratch/chauveau/software/falaise/emchauve-pcd2cd/this_falaise.sh
```

3. Install TKReconstruct

- for track reconstruction we will use TKReconstruct module which we install using following commands:

```
git clone https://github.com/TomasKrizak/TKReconstruct.git
cd TKReconstruct
./install_test.sh
cd ..
```

4. Install calibration tools

```
git clone https://github.com/konarfil/CalibrationTools.git
cd CalibrationTools
./install.sh
```

Running Charge2Energy module

- in the cloned repository you can find configuration file: **CalibrationTools/Tutorial/udd2energy.conf**

- in the configuration file you need to edit three paths:

```
#@key_label  "name"
#@meta_label "type"

[name="flreconstruct" type="flreconstruct::section"]
reconstructionSetupURN : string = "urn:snemo:demonstrator:reconstruction:3.0"

[name="flreconstruct.plugins" type="flreconstruct::section"]
       plugins : string[2] = "TKReconstruct" \
                             "Falaise_ChargedParticleTracking"
       TKReconstruct.directory : string = "/your/path/to/TKReconstruct/build/"

       Charge2EnergyModule.directory : string = "/your/path/to/CalibrationTools/build/Charge2EnergyModule"
```

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```
[name="Charge2Energy" type="Charge2EnergyModule"]
  logging.priority : string = "information"

  gas_pressure : real = 0.89 # tracking gas pressure in bars

  # partial pressures of tracking gas components (should add up to 1)
  He_pressure : real = 0.955 # helium
  Et_pressure : real = 0.035 # ethanol
  Ar_pressure : real = 0.01 # argon

  T_gas : real = 298.0 # tracking gas temperature in Kelvin

  calibration_path : string = "/your/path/to/CalibrationTools/Tutorial/calibration_parameters_tutorial.txt"
```

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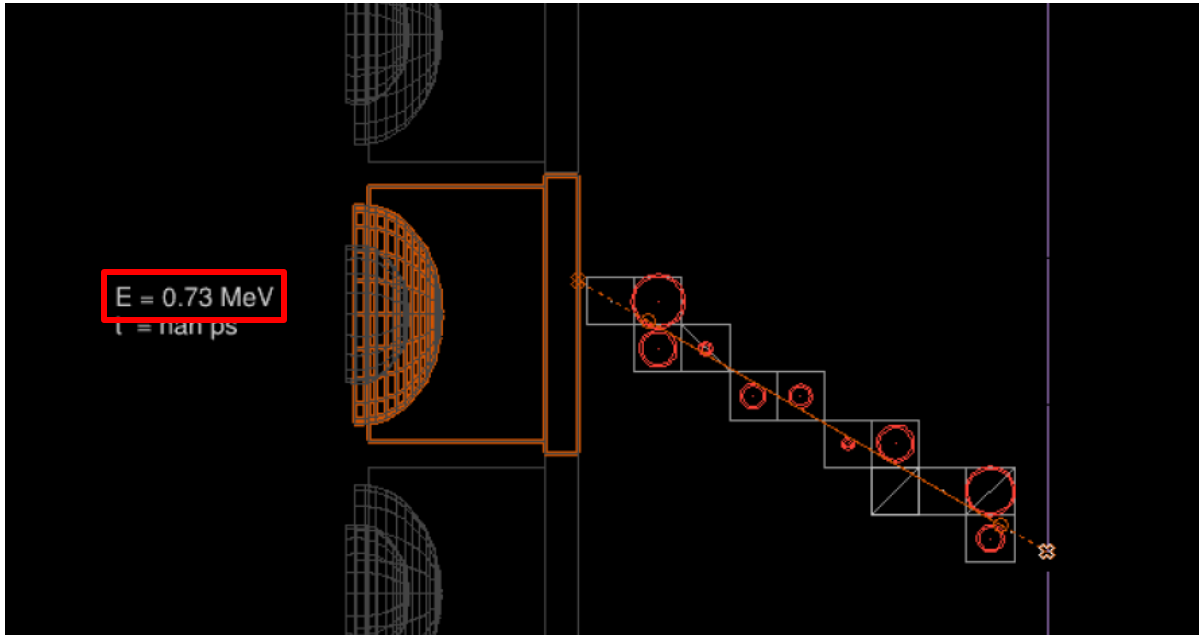
- calibration_parameters_tutorial.txt contains and example set of calibration parameters – not all OMs are present

Running Charge2Energy module

- finally we run flreconstruct

```
flreconstruct -i /path/to/udd_file.brio -p /path/to/CalibrationTools/Tutorial/udd2energy.conf -o /path/to/output.brio
```

- udd files can be found in /sps/nemo/snemo/snemo_data/reco_data/UDD/delta-tdc-10us-v3



Now our calo hits contain energy !