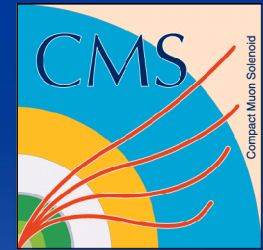# Crack Reconstruction with ORCA_8_7_3

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RAL

Teddy Todorov, Wolfgang Adam *et al*.

CERN

Jon Fulcher *et al*.

Imperial

Giacomo Bruno *et al*.

UCL

and others

Installing ORCA

- `cd` to a directory with ~100 MB of free space

- copy the installation script from my directory:
`cp ~ireid/public/ORCA_8_7_1/getOrcaNew .`

- set the correct SCRAM architecture, e.g:
`setenv SCRAM_ARCH slc3_ia32_gcc323`

- run the script: `./getOrcaNew`

- Total time required approx. 30 minutes

TestBeam Reco

- The TestBeam reconstruction programme `GeneralFU` is made and run in the `TestBeams/TkFilterUnit/test` directory.

- `cd` to this directory and set your environment and the geometry

```
eval `scram runtime -csh`
source setGeom.csh
```

- Run the programme by name: `GeneralFU`

ParticleGun Reco

- The ParticleGun reconstruction programme `GeneralMC` is made and run in the `Tracker/DataHandlingInterface/test` directory.

- `cd` to this directory, set your environment and build the binary

```
eval `scram runtime -csh`
scram b
rehash
```

- Run the programme by name: `GeneralMC`

Data

- Control of the programme is via commands in the `.orcarc` file
- The data source is controlled by the `DaqApplication:InputFile` line (**GeneralFU**) or `FilePath`, `PoolCatalogFile` and `InputCollections` cards (**GeneralMC**).

Output

- Data is output in ntuples in a HBOOK file with default name `general.his`

- This file may be examined with PAW or ROOT (after conversion with `h2root`); track data is in ntuple 102:

  - `RECHIT` data pertains to RecHits in the track (see ntuple 101 for all hits in the event);

  - `RECTRK` data is from the KF updated state;

  - `COMBTRK` data combines the forward and backward KF passes and should be used as the "true" track.

Track Ntuple
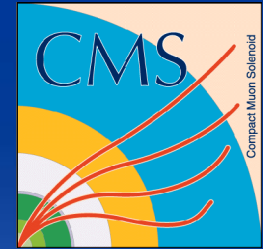
```
****************************************************************
* Ntuple ID = 102    Entries = 25        TRACKDATA
****************************************************************
* Var numb * Type * Packing *    Range    *  Block   *   Name    *
****************************************************************
*      1   * I*4  *         *             * GENERAL  * EVENT
*      2   * U*4  *   10    * [0,1023]    * GENERAL  * NTRACKS
*      3   * U*4  *   10    * [0,1023]    * GENERAL  * TRACKID (of NTRACKS)
*      4   * U*4  *    8    * [0,255]     * GENERAL  * NDOF
*      5   * R*4  *         *             * GENERAL  * CHISQ
*      6   * R*4  *         *             * GENERAL  * RECTRKDX
*      7   * R*4  *         *             * GENERAL  * RECTRKDY         TRUE if RecHit is a
*      8   * R*4  *         *             * GENERAL  * RECTRKDZ         matched r-φ/stereo pair
*      1   * I*4  *         * [0,1023]    * TRACK    * NHITS
*      2   * L*4  *    1    *             * TRACK    * RECHITMATCH(NHITS)
*      3   * R*4  *         *             * TRACK    * RECHITLX(NHITS)  L = Local
*      4   * R*4  *         *             * TRACK    * RECHITLY(NHITS)
*      5   * R*4  *         *             * TRACK    * RECHITLZ(NHITS)
*      6   * R*4  *         *             * TRACK    * RECHITGX(NHITS)  G = Global
*      7   * R*4  *         *             * TRACK    * RECHITGY(NHITS)
*      8   * R*4  *         *             * TRACK    * RECHITGZ(NHITS)
*      9   * R*4  *         *             * TRACK    * RECTRKLX(NHITS)
*     10   * R*4  *         *             * TRACK    * RECTRKLY(NHITS)
*     11   * R*4  *         *             * TRACK    * RECTRKLZ(NHITS)
*     12   * R*4  *         *             * TRACK    * RECTRKGX(NHITS)
*     13   * R*4  *         *             * TRACK    * RECTRKGY(NHITS)
*     14   * R*4  *         *             * TRACK    * RECTRKGZ(NHITS)
*     15   * R*4  *         *             * TRACK    * COMBTRKGX(NHITS)
*     16   * R*4  *         *             * TRACK    * COMBTRKGZ(NHITS)
```

Modifications

- The data in the ntuple are determined by files in the directory `Tracker/DataHandlingInterface/test/stubs`

- `MyEventAnalysis` extracts the track information and passes it to `GenTrackNtuple` for writing to file

- Feel free to modify your private copies of these files to suit your needs

Compiling Mods

- If you make modifications to the `stubs` files, recompile GeneralFU in the `TkFilterUnit/test` directory with the commands:

$$\texttt{scram b clean; scram b}$$

- Proper treatment of a matched-hit seed in Layer 1 (affecting Z values only) requires KFSplittingFitter to be activated in the `.orcarc` file and special consideration of the ntuple data.

Support

- Feel free to ask for help and advice
- Please let me know of any bugs or problems!

-ivan