TreeIris Manual

October 8, 2015

1 General Description

TreeIris is the analysis program used to write data from IRIS experiments stored in MIDAS data files (*.mid.gz) to root-trees. After compiling (`make`), it can be run using the command

```
./bin/anaIris -c=/your/config.txt /your/data.mid.gz
```

You can set an maximum number of events to be read with the option `-e`. The option `-nt` disables the readout of TDC data.

2 Configuration Files

The main configuration file contains the paths to all other files to detector calibrations or other configuration files as well as other commands. The file is parsed and filenames are stored when the parameter names are found. Parameter name and input have to be separated by '=' and parameters without input have to end in '!' in order for the parser to work. Lines beginning with '/' or '#' are skipped. The following parameters are supported:

`PATH` Common path for all config files. Optional.

`GEOMETRY` Contains detector sizes (`YDR1`, `YDR2`, `SDR1`, `SDR2`), distances to the target(`YDD`, `SD1D`, `SD2D`), and the beam shift (`XSHIFT`, `YSHIFT`). Detector thicknesses to be implemented. Parsed the same way as the main file.

`ELOSS` Root file containing energy loss graphs.

`ASCII` enables the data output as an ASCII file.

Detector calibration files can be specified using `IC`, `CSI1`, `CSI2`, `SD1R`, `SD1S`, `SD2R`, `SD2S` `YD`. `SD`, `SU`, and `YU` to be implemented.

`GATES` Root file containing graphical cuts for protons/deuterons.

`USE_ICGATES!` If this is set, the IC energy will be used to select incoming isotopes. The energy values for each isotope can be set in the file containing run dependant parameters.

`DEDX_P/D/I1/I2/I3` Contains the names of the graphs to be read from the energy loss root file for protons, deuterons and up to three incoming ions/ejectiles. Parsed the same way as the main configuration file. Files can be specified for the following materials : Ag, Al, B, D2, H2, My (Mylar), P, Si, and Si02.

`RUNDEPPAR1/2/3` Contains run or ion dependent parameters.

- Incoming beam: The energy in front of the target (`EBAC`), particle mass (`BMASS`), mass number (`BA`), and charge (`BZ`). The IC gates are also defined here (`BICMIN` and `BICMAX`).
- Target: Particle mass (`TMASS`), mass number (`TA`), charge (`TZ`), and thickness (`TTH`).
- Ejectiles: Particle mass (`LEMASS`, `HEMASS`), mass number (`LEA`, `HEA`), and charge (`LEZ`, `HEZ`). If no values are given, the beam values will be used for the heavy ejectile and the target values for the light ejectile.

3 To Do

- TDC readout is included, however, they are not associated with any detector yet.
- Some adjustment to detector gains are still hardcoded.
- CsI1 cannot yet properly calibrated ring-by-ring. Do we need an option to switch ringwise calibration on and off?
- do we need the possibility to use the 'CsI slope'?
- Investigate slight changes for TSdThetaCM compared to old version.
- Much more, surely...