

# **MAUS Analysis User System User Guide**

## Chapter 1

# Running for the First Time

## Chapter 2

# Detector Description

## Chapter 3

# Setting up a Geometry

## Chapter 4

# Appendix A: Run Control Variables

## Chapter 5

## Appendix B: Spill Structure

spill:

- mc
  - *array item*
    - \* virtual\_hits: Virtual hits store information on all particles as they cross a user-defined plane in space, time or proper time
    - \* tracks: Stores information on stepping information, initial and final position of the track. Enabled by 'keep\_tracks' datacard
    - \* hits: Stores information on interactions of particles with sensitive detectors
    - \* primary: Describes the initial particle that is used as an input into the Monte Carlo simulation

spill/mc/array item/virtual\_hits:

- *array item*
  - track\_id: Identifier for the track that made the hit
  - path\_length: Total path length travelled of the particle that made the hit [mm]
  - b.field: Magnetic field at the position and time that the hit was recorded [kT]
    - \* y
    - \* x
    - \* z
  - e.field: Electric field at the position and time that the hit was recorded [MV/mm]
    - \* y
    - \* x
    - \* z
  - charge: charge of the particle that made the hit [ $e^+$  charge]
  - particle\_id: Identifies the particle type according to the PDG indexing system (<http://hepdata.cedar.ac.uk/lbl/2011/reviews/rpp2011-rev-naming-scheme-hadrons.pdf>)
  - station\_id: ID for the virtual plane that registered this hit. See Mice-Modules docs for options on how stations are numbered.
  - mass: mass of the particle that made the hit [ $\text{MeV}/c^2$ ]
  - momentum: Momentum of the track that made the hit [ $\text{MeV}/c$ ]
    - \* y
    - \* x
    - \* z
  - time: particle time for the track that made the hit [ns]
  - position: Position of the hit [mm]
    - \* y

- \* x
- \* z
- proper\_time: Relativistic proper time of the particle that made the hit [ns]

spill/mc/array item/tracks:

- initial\_momentum: Initial momentum of the track [MeV/c]
  - y
  - x
  - z
- initial\_position: Initial position of the track [mm]
  - y
  - x
  - z
- particle\_id
- steps: Stores information on each step in the tracking. Enabled by 'keep\_steps' datacard
- parent\_track\_id
- track\_id
- final\_momentum: Final momentum of the track [MeV/c]
  - y
  - x
  - z
- final\_position: Final position of the track [mm]
  - y
  - x
  - z

spill/mc/array item/hits:

spill/mc/array item/primary:

- random\_seed
- energy
- particle\_id
- time
- position
  - y



- x

- z

- momentum

- y

- x

- z

spill/mc/array item/tracks/steps:

- array item

- energy\_deposited: Energy deposited by the track on the previous step [MeV]

- path\_length: Distance travelled by the particle when it made the step [mm]

- energy: Energy of the track [MeV]

- momentum: Momentum of the track that made the step [MeV/c]

- \* y

- \* x

- \* z

- time: Time of the track in lab frame when it made the step [ns]

- position: Position of the step [mm]

- \* y

- \* x

- \* z

- proper\_time: Proper time of track when it made the step [ns]