

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 [MeV/c^2]
 - momentum: Momentum of the track that made the hit [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]