

IRENE: InteRfacE for a Next Event

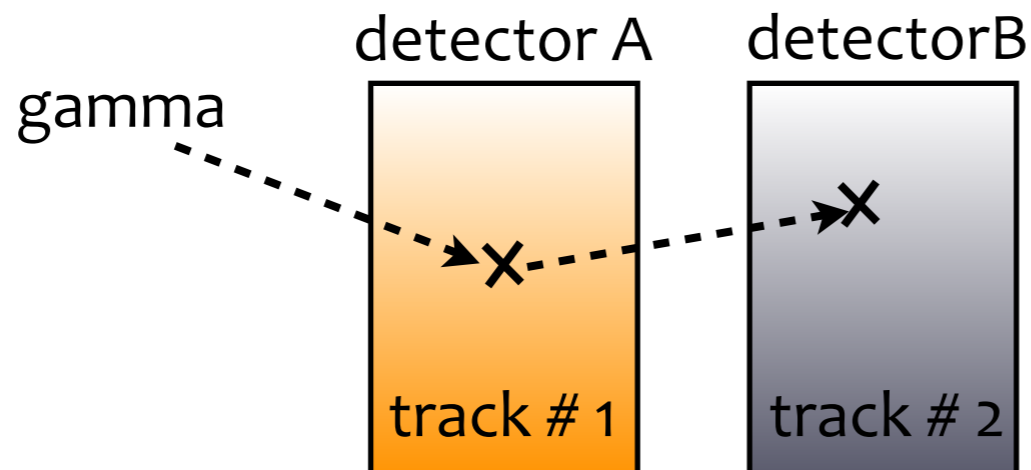
Library that provides objects that can be made persistent for C++ simulations, through ROOT

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- ◆ **Event** basic class with 4 data members: event ID, tracks, particles and sensor hits
 - ◆ **event ID**: unique identification number for a particular event
 - ◆ **tracks**: set of true hits (position in space time + energy deposition) associated to a specific particle and to a specific detector
 - ◆ **particles**: set of particles produced in the simulation with all their properties (initial energy, momentum, origin and decay vertices and volumes, mother, daughters, associated track)
 - ◆ **sensor hits**: sensor response (identification number of the sensor, its position, waveform in photoelectrons)
- ◆ To access the data members of all the classes, getters and setters methods are provided.

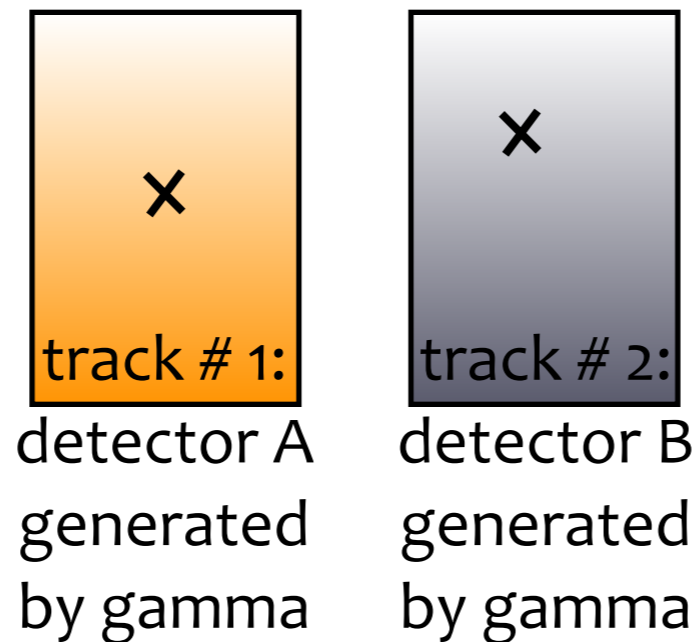
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- ◆ **Particle**: class that describes a particle produced in the simulation from the beginning to the end.
 - ◆ initial/final momentum and energy
 - ◆ initial/final vertex
 - ◆ Geant4 volume where it's **created** and where it **dies**
 - ◆ "primariness": if it's primary or is generated through some physical process (in which case, also **mother** particle and **creator process**)
 - ◆ **daughters** (if any)
 - ◆ **mass, charge, lifetime**
 - ◆ **track length**: length of the track calculated by Geant4
 - ◆ **tracks**: set of references to Track objects, which carry the true hits of the event



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♦ **Track**: class that contains a set of true energy deposition hits associated univocally to one **particle** and one **detector**



♦ **hits**: set of hits labelled by position + time + energy deposition

♦ **track length**: length of the track of the associated particle, calculated by Geant4

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- ◆ **SensorHit**: class that contains the information of the response of the light sensors (e.g PMTs, SiPMs...)
 - ◆ **waveform**: set of pairs time/amplitude in photoelectrons
 - ◆ **amplitude**: sum of all the amplitudes of the waveform
 - ◆ **ID**: unique identification number
 - ◆ **position**: position of the sensor inside the detector
 - ◆ **bin width**: width of the waveform time bin
 - ◆ **detector name**: type of detector (PMT, SiPM...)