

Cremlin+ Detector

Workshop: Geant4 Tutorial

Hands-On Review

Introduction

Goals:

Designing simulation of simple RICH detector with Aerogel and photon detectors
Plotting and analyzing data for PID

Based on my own YouTube tutorials (Physics Matters)

(Installation of Geant4 on Linux computers)

Requirements: Linux computer, tested with specific Geant4 version (10.7.1)

Running some examples (e.g. B1) for getting deeper understanding

Creating empty CMake project and inserting all relevant parts:
run manager, detector construction, particle gun, sensitive detectors etc.

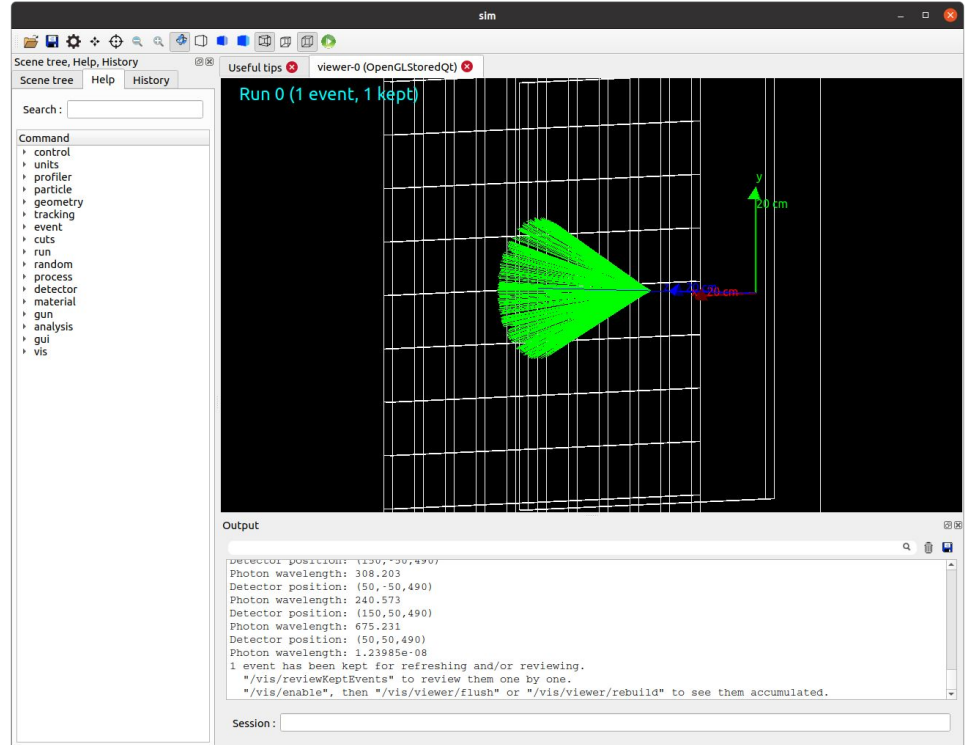
Simulating Cherenkov Light

Simulation including...

photodetector array with detector efficiency

Aerogel radiator with wavelength dependent refractive index

Event display for visualization of Cherenkov photons

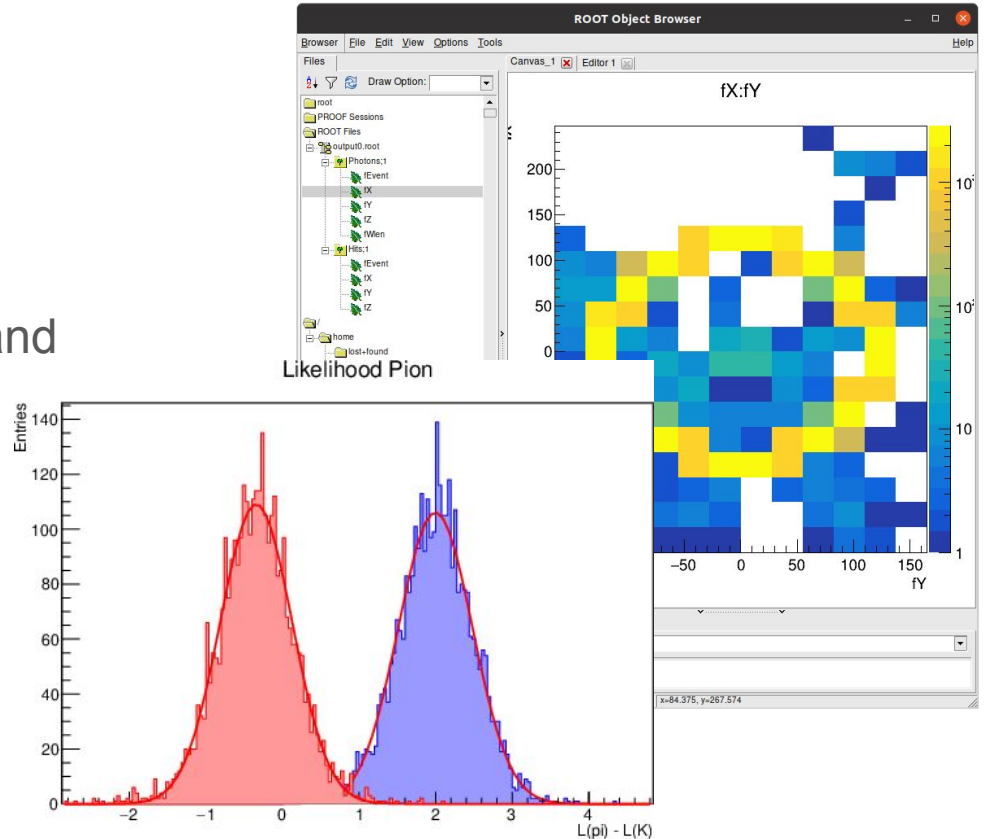


Simple Reconstruction

Simple ROOT output format

Creating small script for data
visualization circular fits

Reconstructing Cherenkov angle and
calculating likelihood values



Learning Goals

Fundamental basics of designing Geant4 programs

Creating a simple RICH detector in Geant4

Simulating and reconstructing events in HEP

Theory of particle identification and Cherenkov detectors

Calculation and usage of likelihood values