Electron Detector G4 Simulation Update

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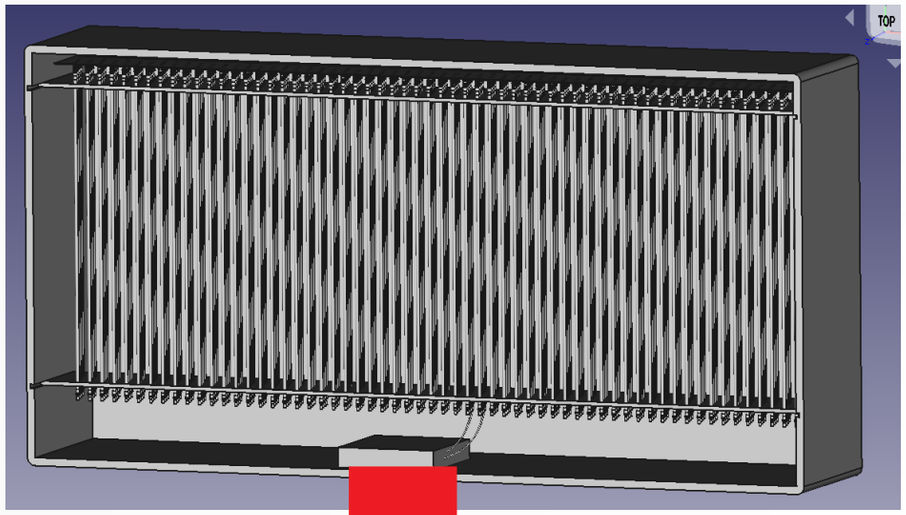
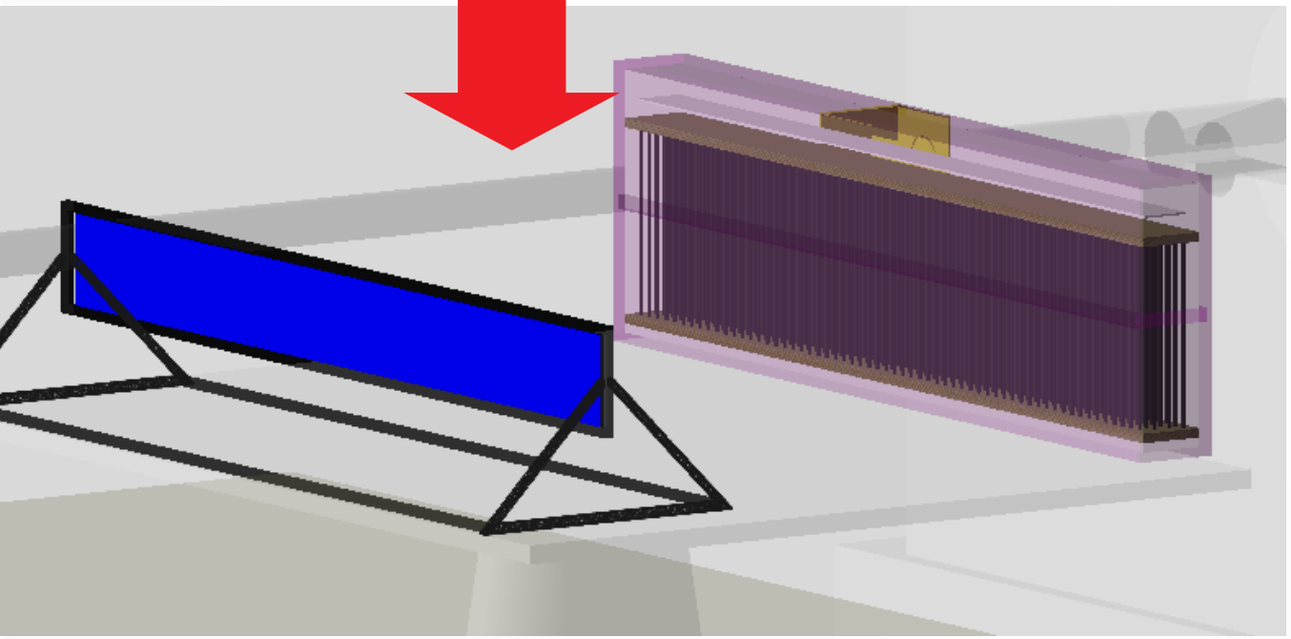
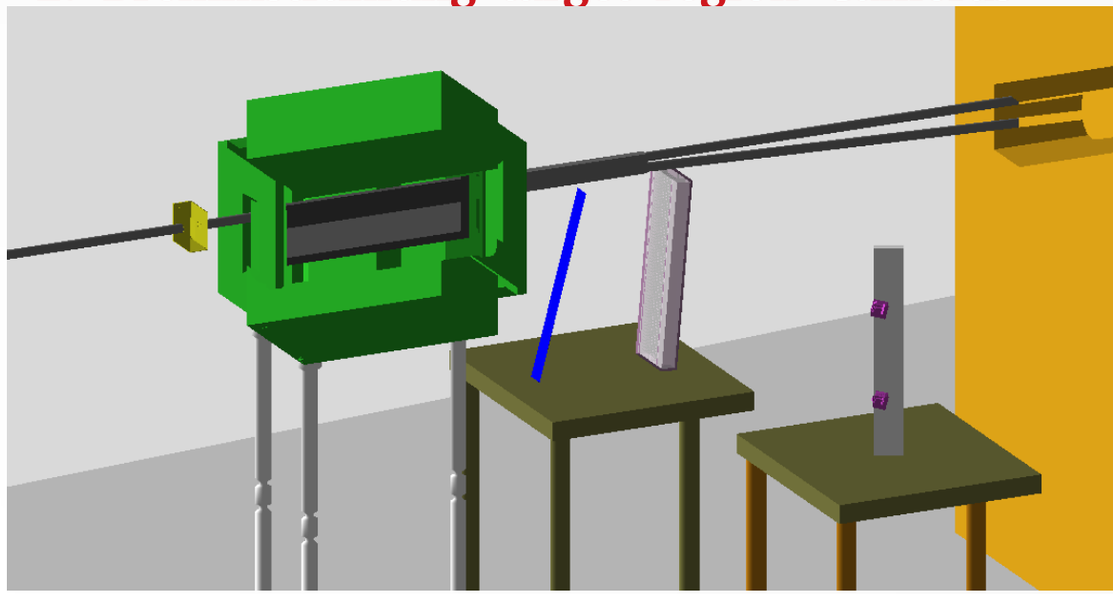
One-Slide Summary

1. Straw Cerenkov Design Inception & IP support update

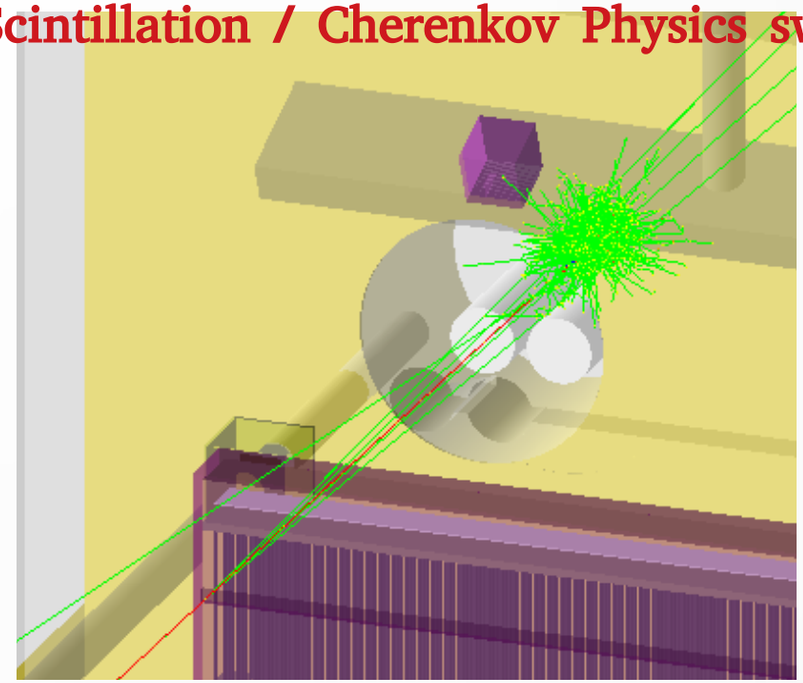




2. Bremmstrahlung target region Cameras



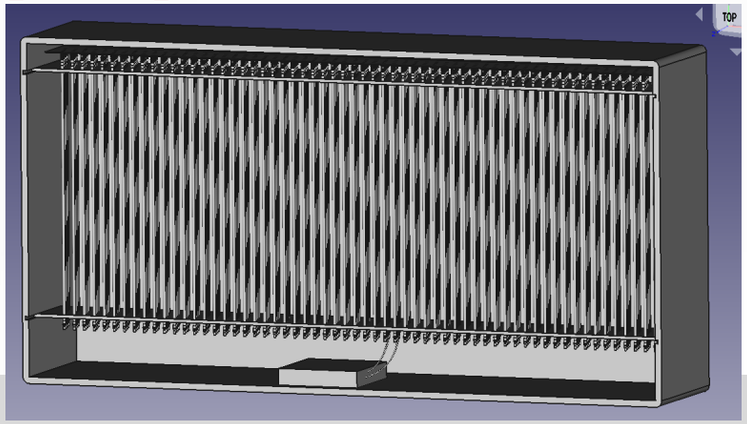
3. Scintillation / Cherenkov Physics switch



backup

Details

1. Straw Cerenkov Design Inception & IP support update



Simplifications were made for the G4 model. No need to go crazy right now with details. Most important aspect, being the substructure of the straws, is highly detailed.

We are considering more shielding within the box. Analysis of the 'electronics' board radiation environment will inform this.

Fine-tuning in terms of positioning will also be shortly completed.

The design may also be susceptible to angular deviation of e- spectrum, so long-term we may consider designs to take this in to account.

2. Bremmstrahlung target region Cameras

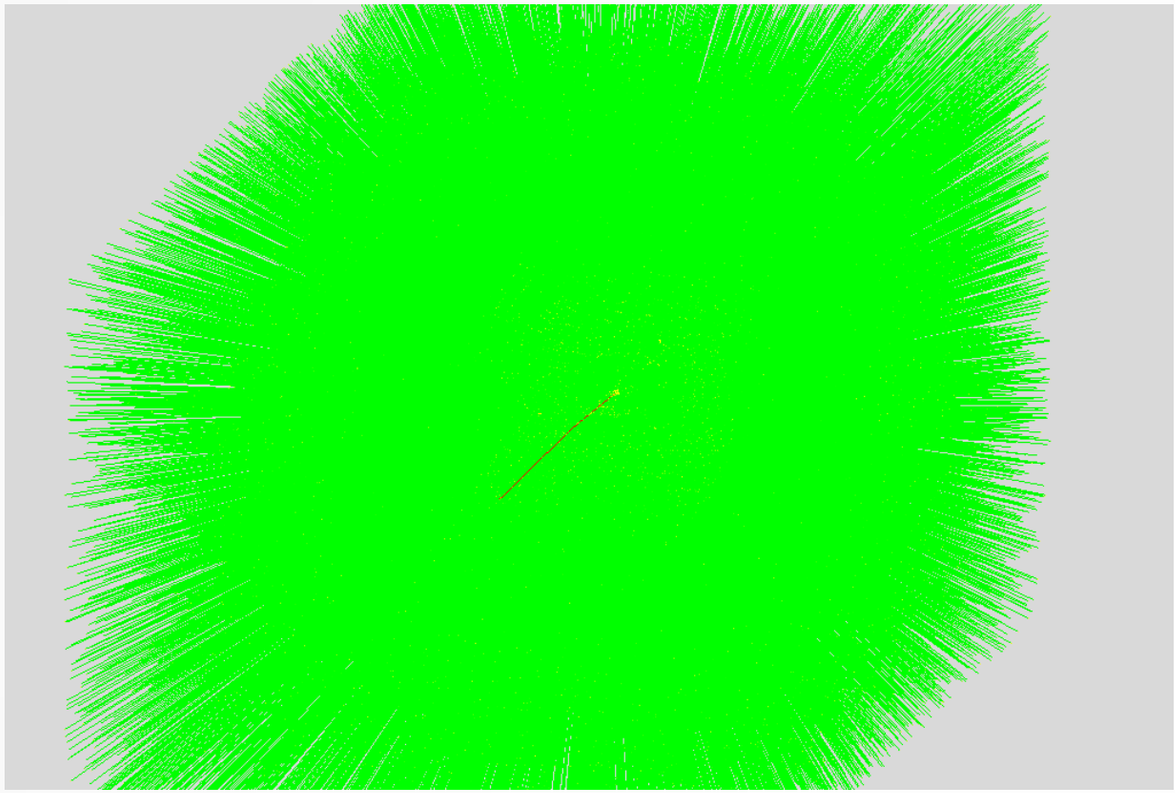
Copies of IP region cameras, placed on optical table as throughout the experiment.

Cameras are 1.5m down beamline from center of Scintillation screen, at total distance ~1.6m at angle 22 deg.

Scintillation Screen and Cerenkov device is not yet fully supported. Need to create a new frame for the screen at the least.

Details

3. Scintillation / Cherenkov Physics switch



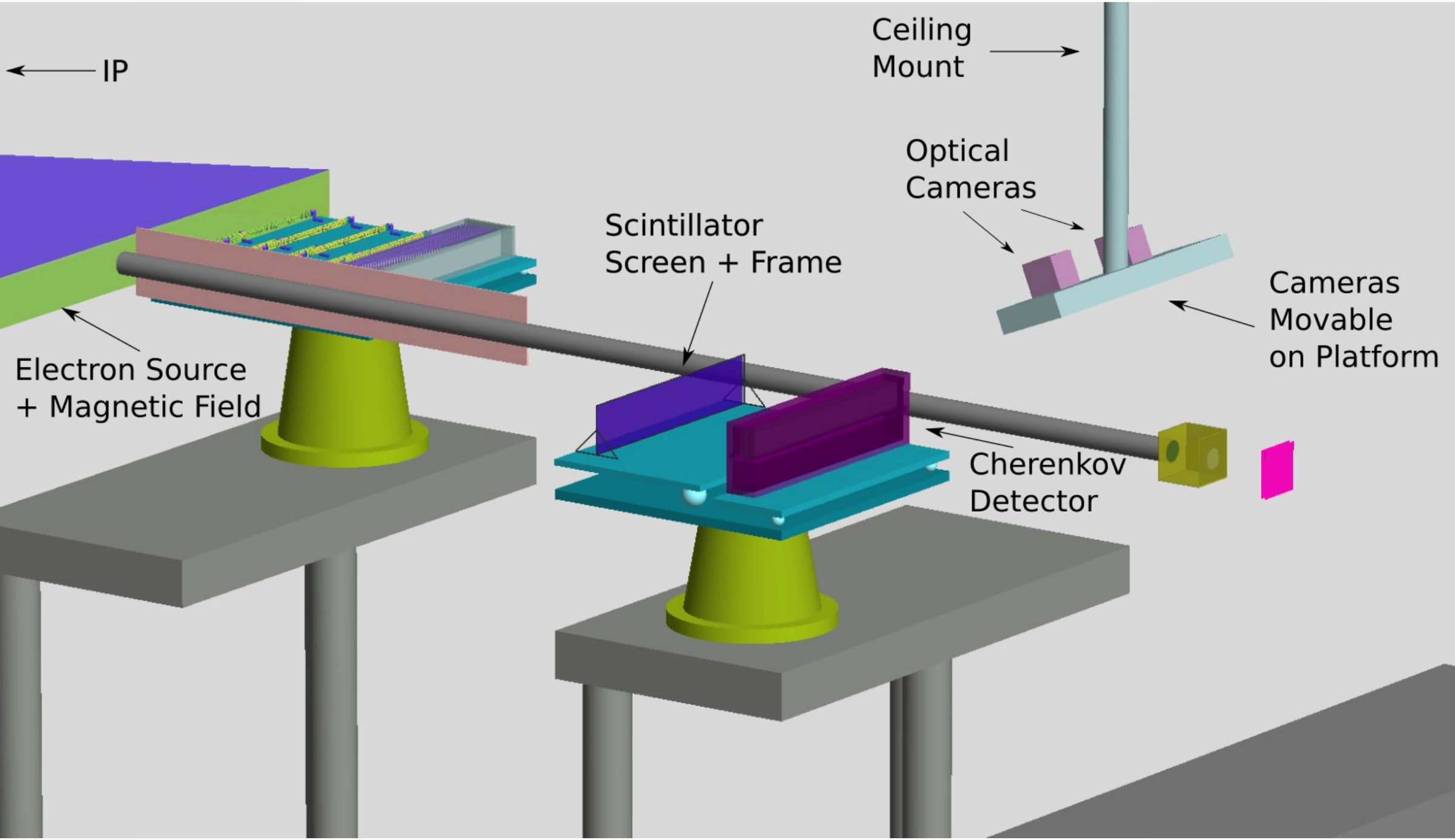
LxSetup:ScintCerenkovPhysics = true to enable. Requires default physics list PhysicsList() in main(), i.e. not yet functional with QGSP_BERT_HP.

Will inflate computation time and intercept_volume TTree sizes, we consider modifying steppingaction to remove possibility optical photons are included in TTree

Each medium requires refractive index/scintillation efficiency defined in DetectorConstruction. So Cherenkov emission is not simulated for simulatin environment, as long as its n is not defined. OpticalPhysics.cc controls key parameters eg. ScintillationYield, an important simple factor of the number of simulated photons / real life expectation.

Reconstructions then require to reverse scintillation yield, if counting photons.

Scintillation response will render visualisation unusable!


IP
Ceiling
Mount
Optical
Cameras
Scintillator
Screen + Frame
Cameras
Movable
on Platform
Electron Source
+ Magnetic Field
Cherenkov
Detector