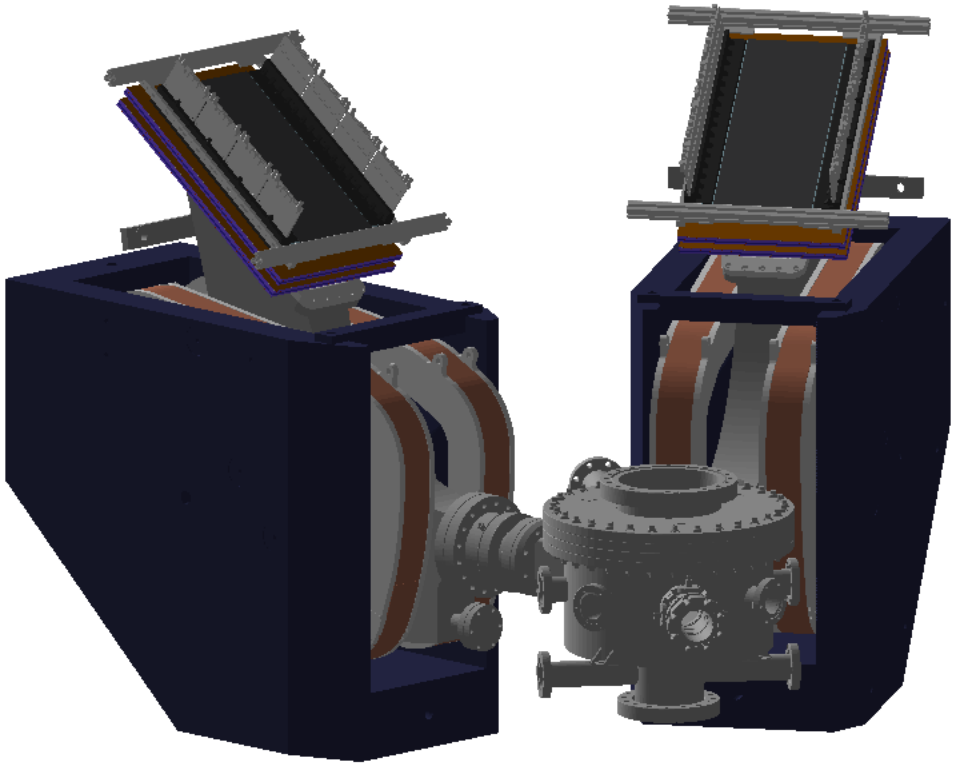

Quantifying the Interference of the Scintillator Frame

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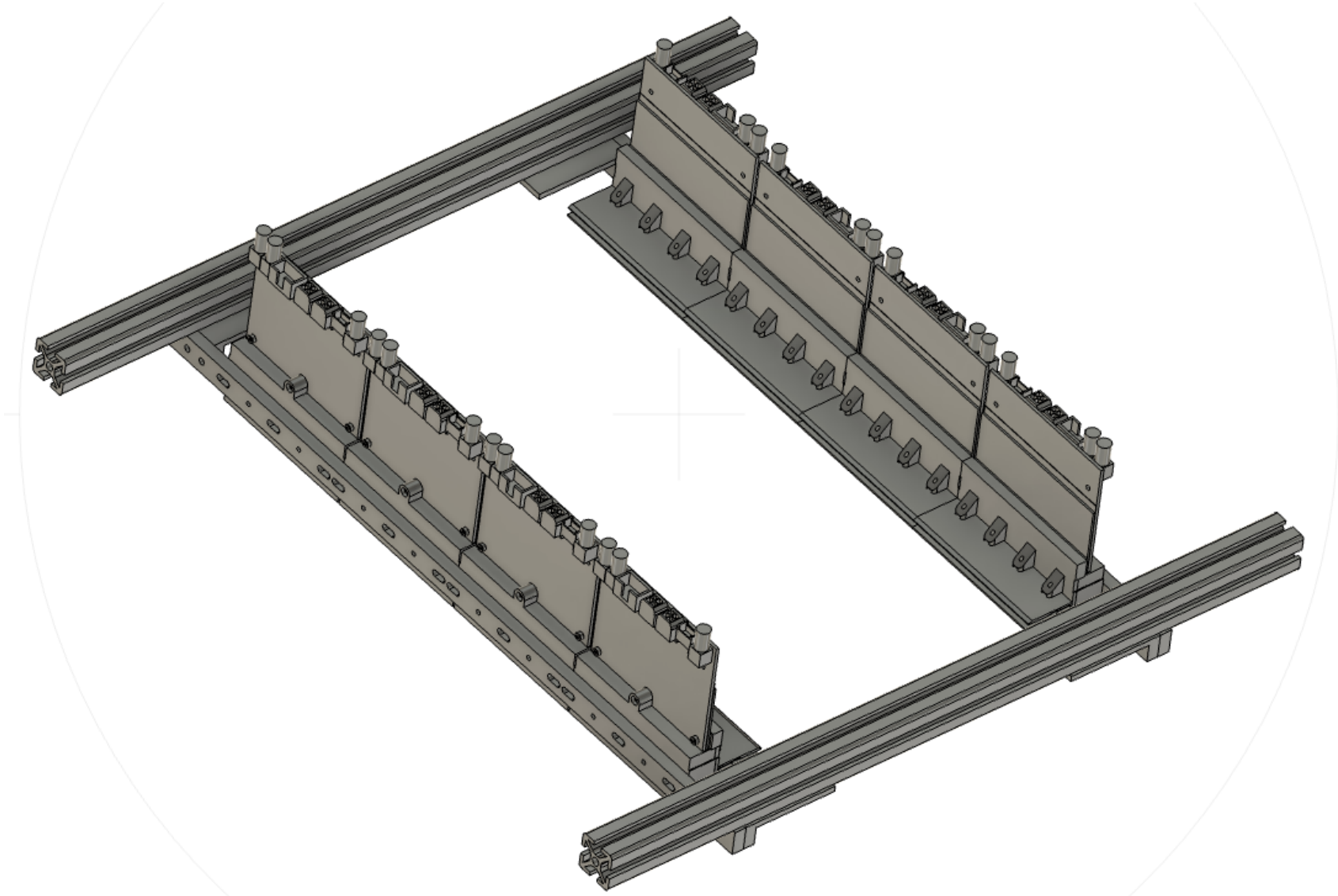
Scintillator Frame in Geant4

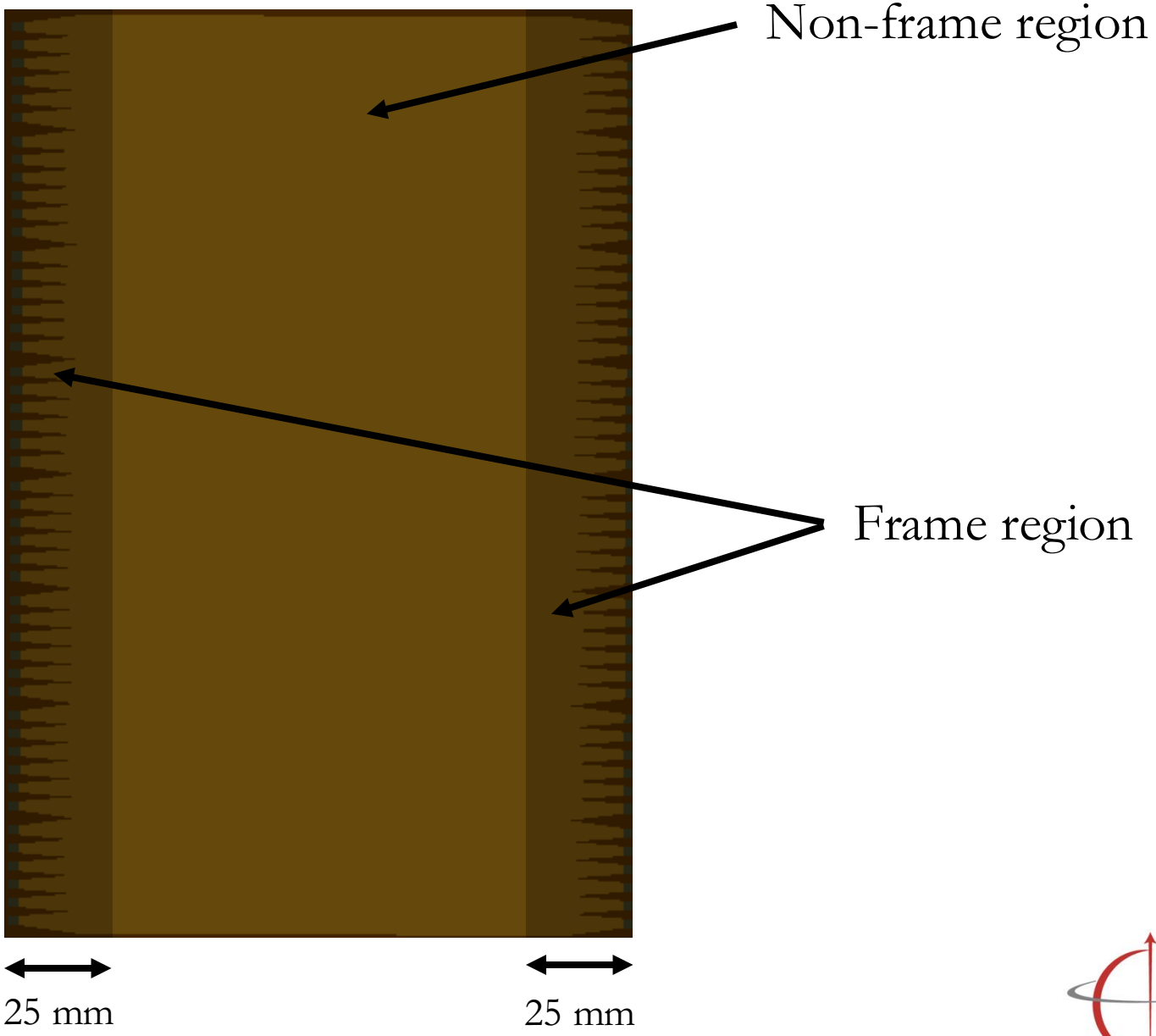


Scintillator in Geant4

Scintillator in Geant4

Scintillator in Geant4

Scintillator in Geant4



Macro Files for Simulation

This macro is used to run the simulation without the frame.

```
# Initialize
/run/initialize

# Random gun
/gun/mode random

# Save the Random Number Status files
/random/setSavingFlag

# Set the directory where the Random Number Status files will be stored
/random/setDirectoryName ../random

# And run
/run/beamOn 200000
```

Macro Files for Simulation

This macro is used to run the simulation when the frame is included.

```
# Initialize
/run/initialize

# Random gun
/gun/mode random

# Use same seeds from previous run
/random/resetEngineFrom ../random/G4Master_currentRun.rndm

# And run
/run/beamOn 200000
```

Results

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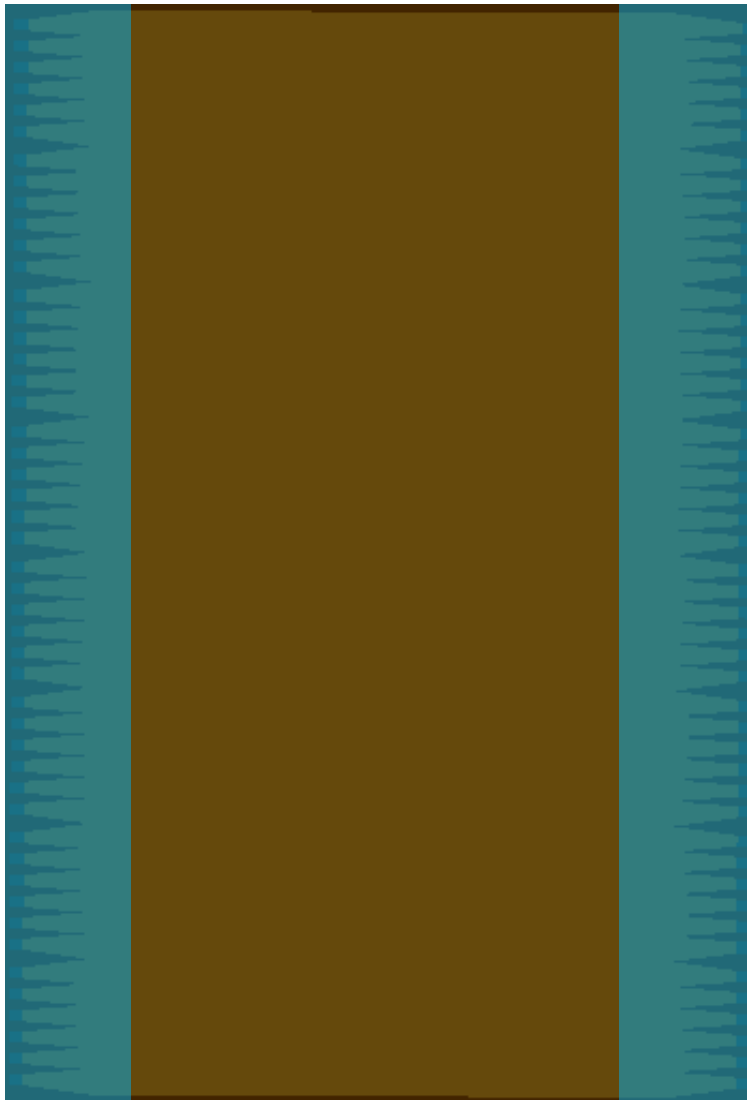
Results

Frame Region



Results: Frame Region

Random Gun; 200,000 events

Particle	Trigger Channel	Raw Hits [With frame]	Raw Hits [Without Frame]	β

$$\beta \quad \frac{raw\ hits\ \{WITH\ FRAME]}{raw\ hits\ [NO\ FRAME\}}$$

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Results: Frame Region

Random Gun; 200,000 events

Particle	Trigger Channel	Raw Hits [With frame]	Raw Hits [Without Frame]	β

$$\beta \quad \frac{raw\ hits\ \{WITH\ FRAME]}{raw\ hits\ [NO\ FRAME\}}$$

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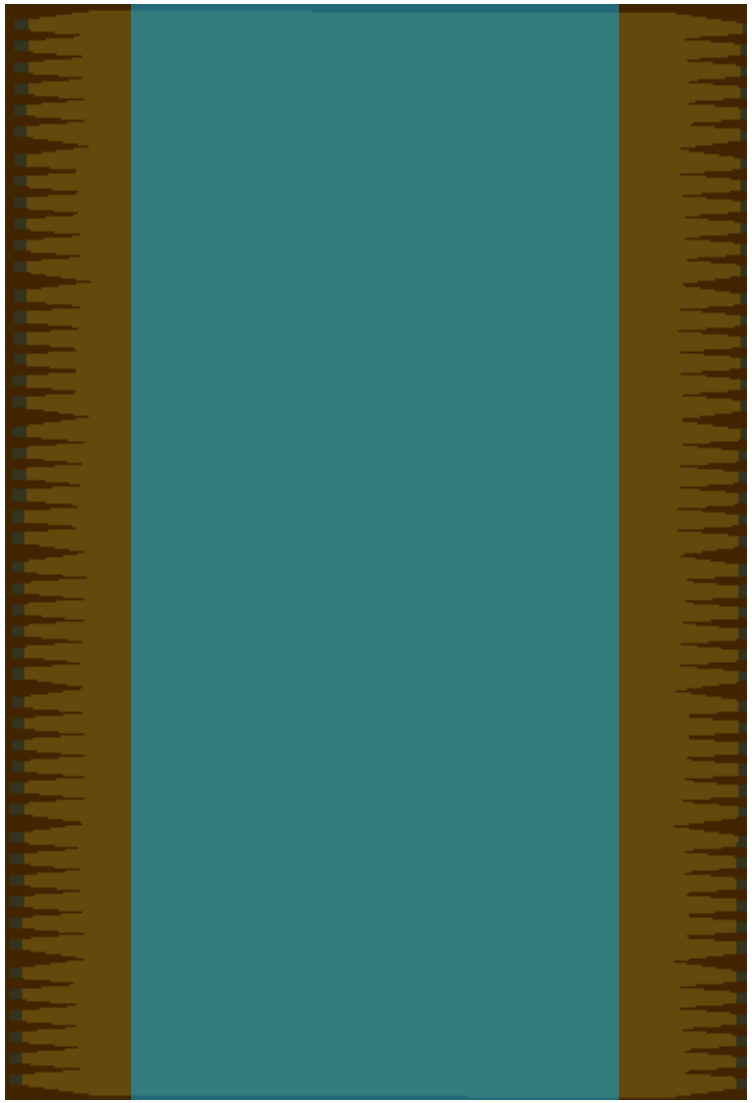
Results

Non-Frame Region



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Results: Non-Frame Region

Random Gun; 200,000 events

Particle	Trigger Channel	Raw Hits [With frame]	Raw Hits [Without Frame]	β

$$\beta \quad \frac{raw\ hits\ \{WITH\ FRAME]}{raw\ hits\ [NO\ FRAME\}}$$

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Results: Non-Frame Region

Random Gun; 200,000 events

Particle	Trigger Channel	Raw Hits [With frame]	Raw Hits [Without Frame]	β

$$\beta \quad \frac{raw\ hits\ \{WITH\ FRAME]}{raw\ hits\ [NO\ FRAME\}}$$

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Next Steps

1. Add a "software trigger" into this analysis.
    - In the Geant4 simulation, the scintillators are not currently used as a trigger.
    - How will the scintillator frame effect the triggering of events? How will the GEM and scintillator hits be affected?

2. Perform independent studies on the metal bars and the plastic holders within the scintillator frame.
    - Do particles scatter off the metal bar and re-enter the active area of the GEM?
    - What is the probability that particles scatter off the metal bars and into the active area of the scintillator?

Any suggestions?