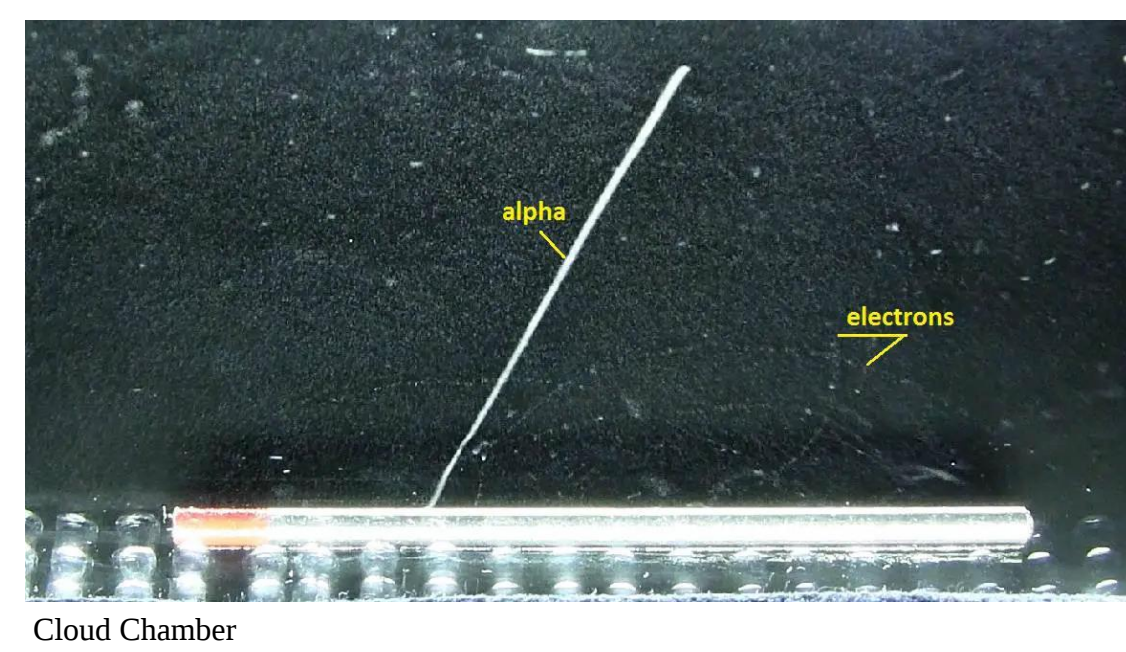


Objectives & Mission Relevance

Relevance: Radiation Interaction Visualization



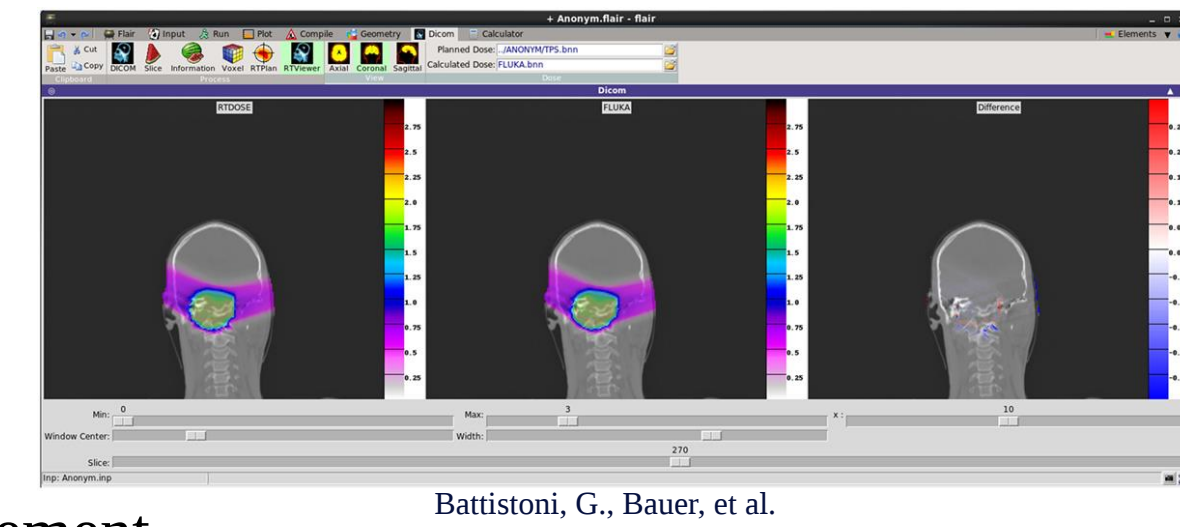
Radiation is Invisible to the Naked Eye.

- Wilson Cloud Chamber
- Uses Alcohol
 - Create Supersaturated Vapor Conditions
 - Energetic Charged Particles Interact
 - Results in a Trail or Particle Track

Radiation Modeling Software

- Geant 4
 - MCNP
 - EGSnrc
 - FLUKA
 - RayXpert
- Use Cases
- Medical
 - Reactors
 - Space
 - Shielding
 - Waste Management

Fluke Use Case



MR Example

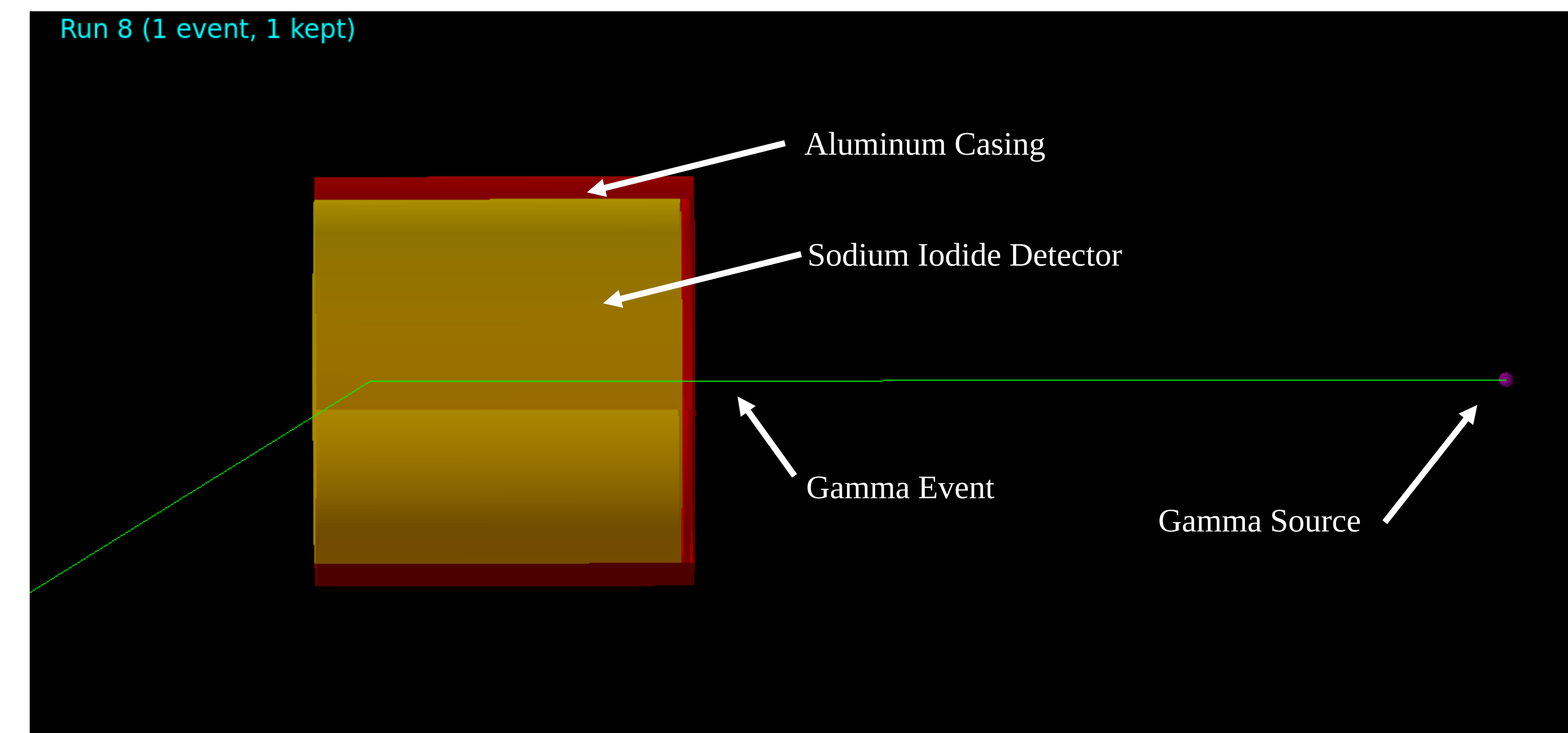


- Virtual Reality (VR)
- Fully immersion into a digital environment.

- Mixed Reality (MR)
- Virtual objects overlay on real objects.

Objective: Output Geant 4 Simulation into VR.

Geant 4 Visualization Simulator



VR Headset Info

- Meta Quest 3

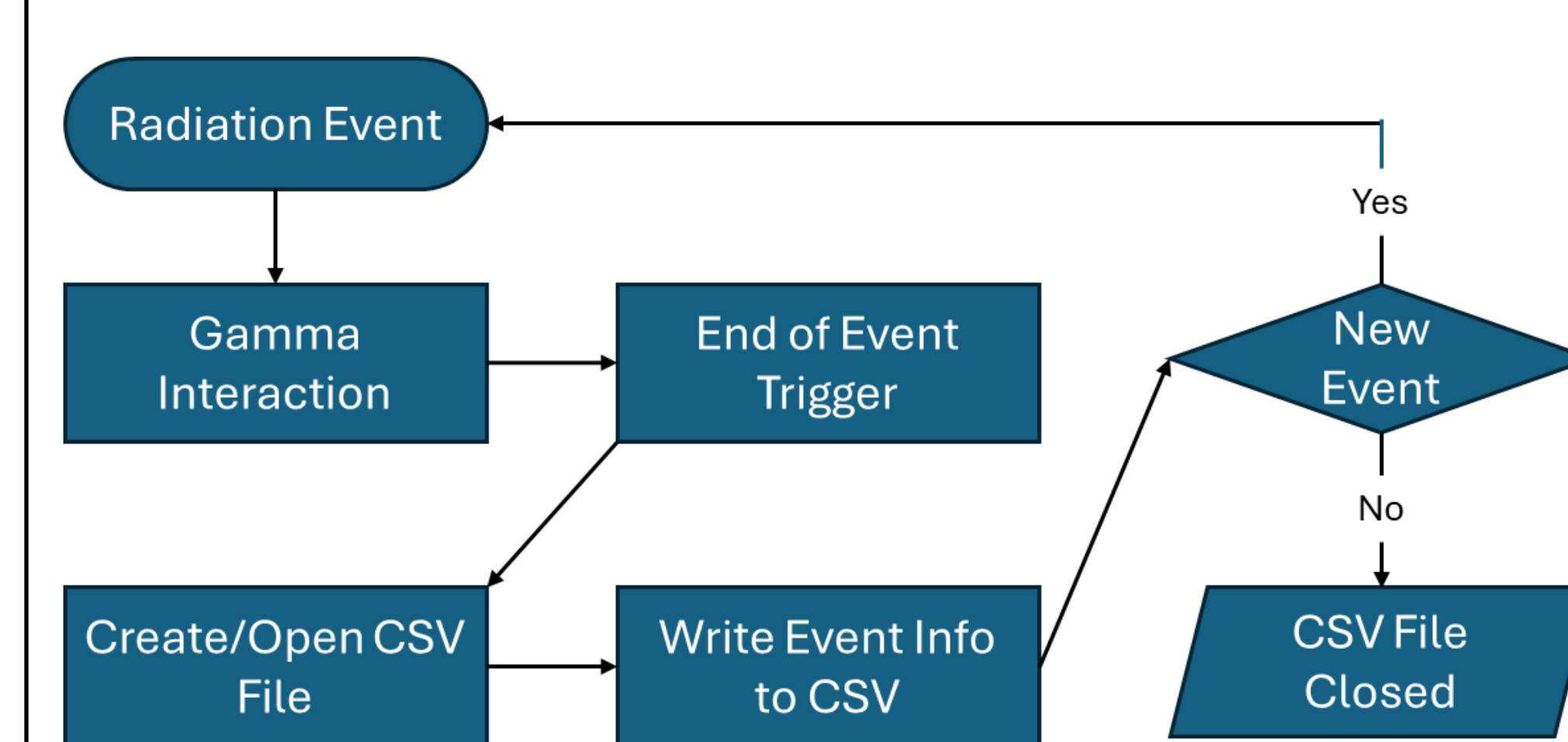


Simulation Parameters:

Source Type: Gamma
Gamma Energy: 1 MeV
World Volume: 20 m³
Source to Detector Distance: 10 cm
Detector Diameter: 2 Inch Diameter
Detector Height: , 2 Inch Height
Window Casing: 0.5 mm
Source Info: Particle Gun (Purple)
World Volume Material: Air
Number of Events: 1000

Method & Results

Geant 4 Event Output



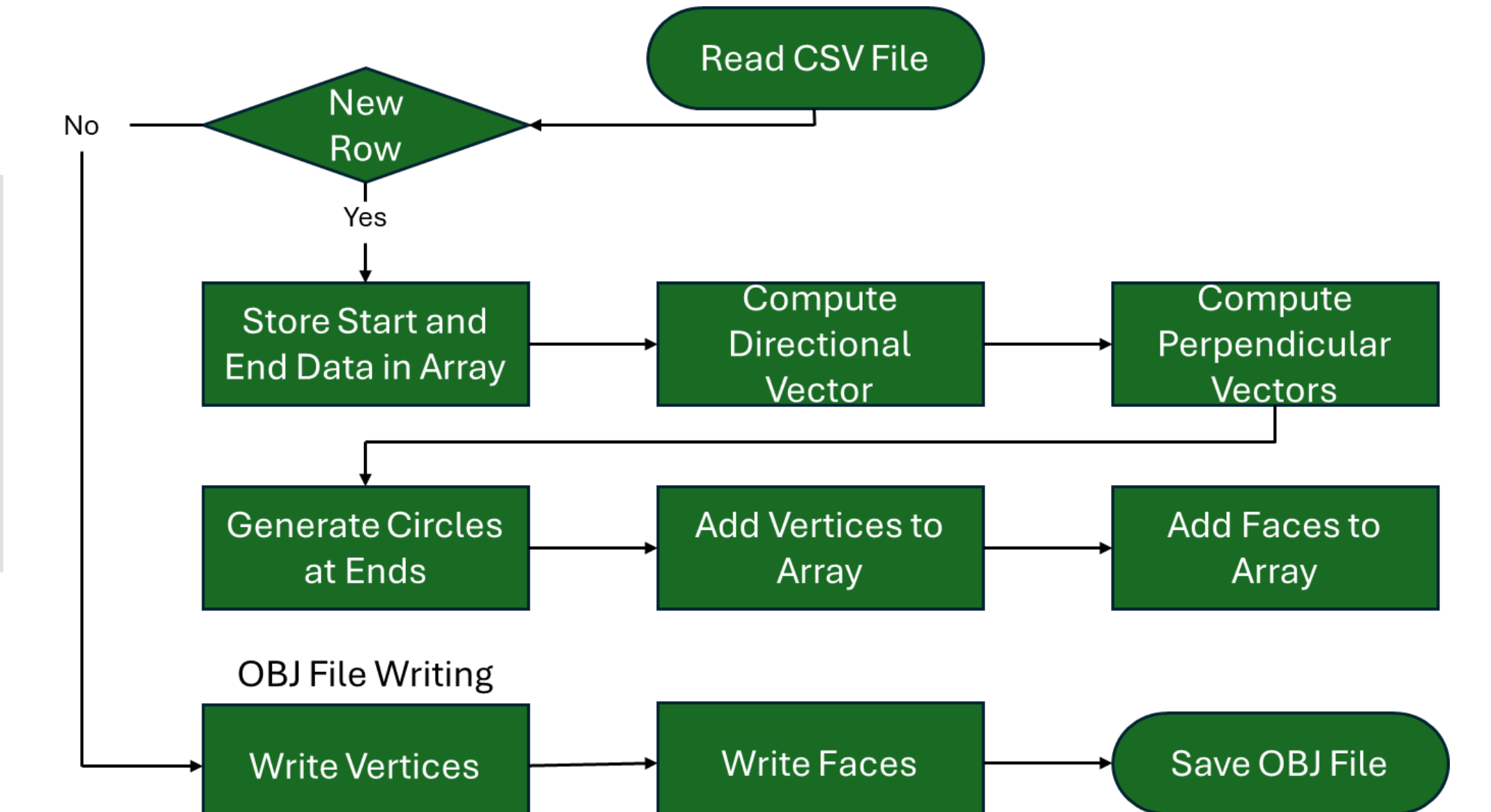
CSV Format

EventID	0
TrackID	1
InitialParticle	gamma
FinalParticle	gamma
StartX	0
StartY	0
StartZ	-10
EndX	0
EndY	0
EndZ	-9
DirX	0
DirY	0
DirZ	1
Height	1

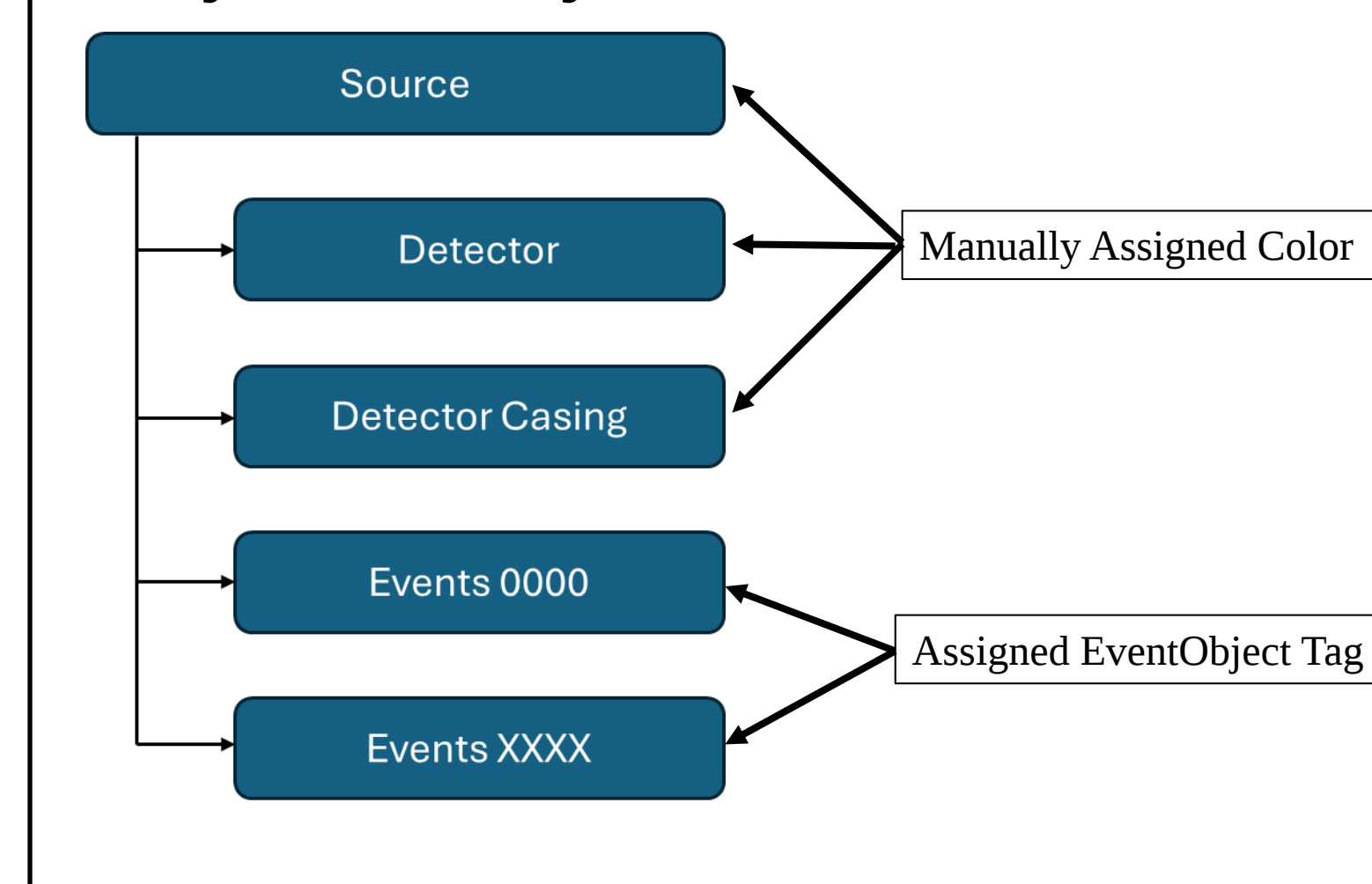
Info Used

EventID	0
StartX	0
StartY	0
StartZ	-10
EndX	0
EndY	0
EndZ	-9

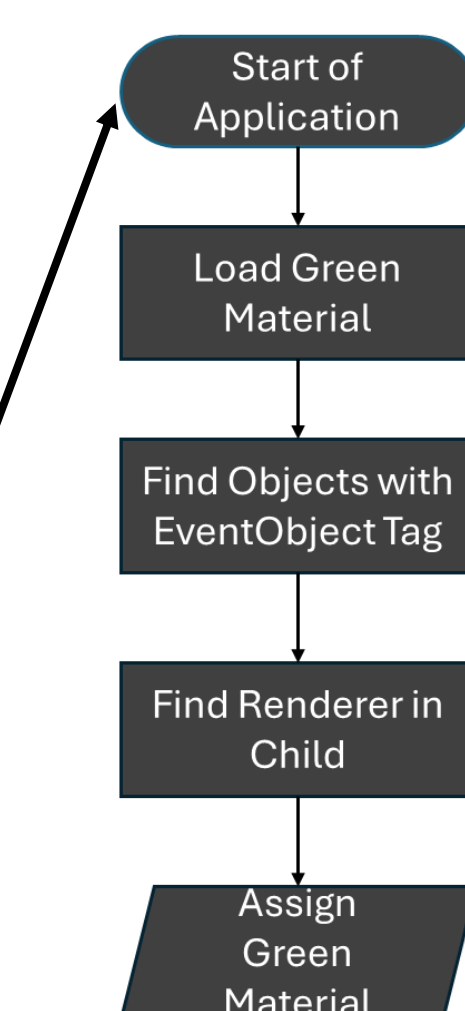
CSV Conversion to Object File



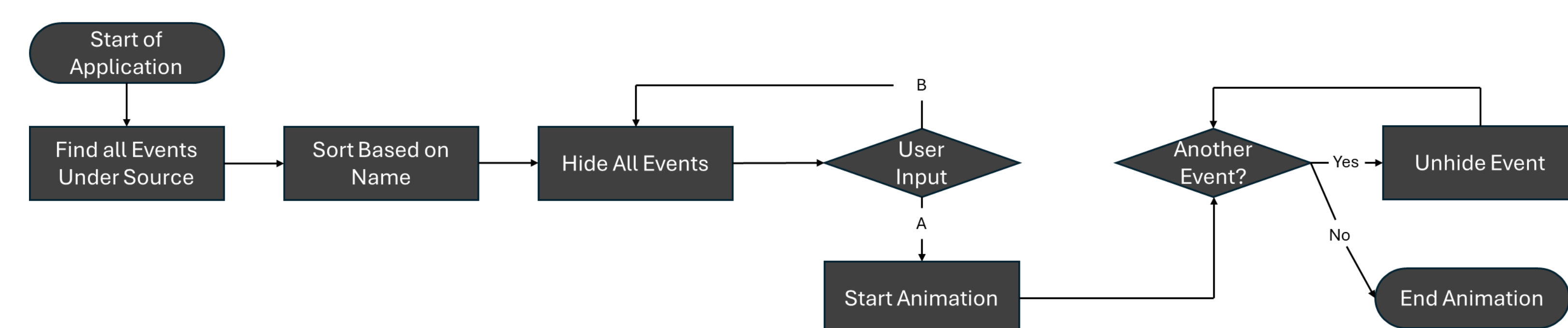
Unity Hierarchy



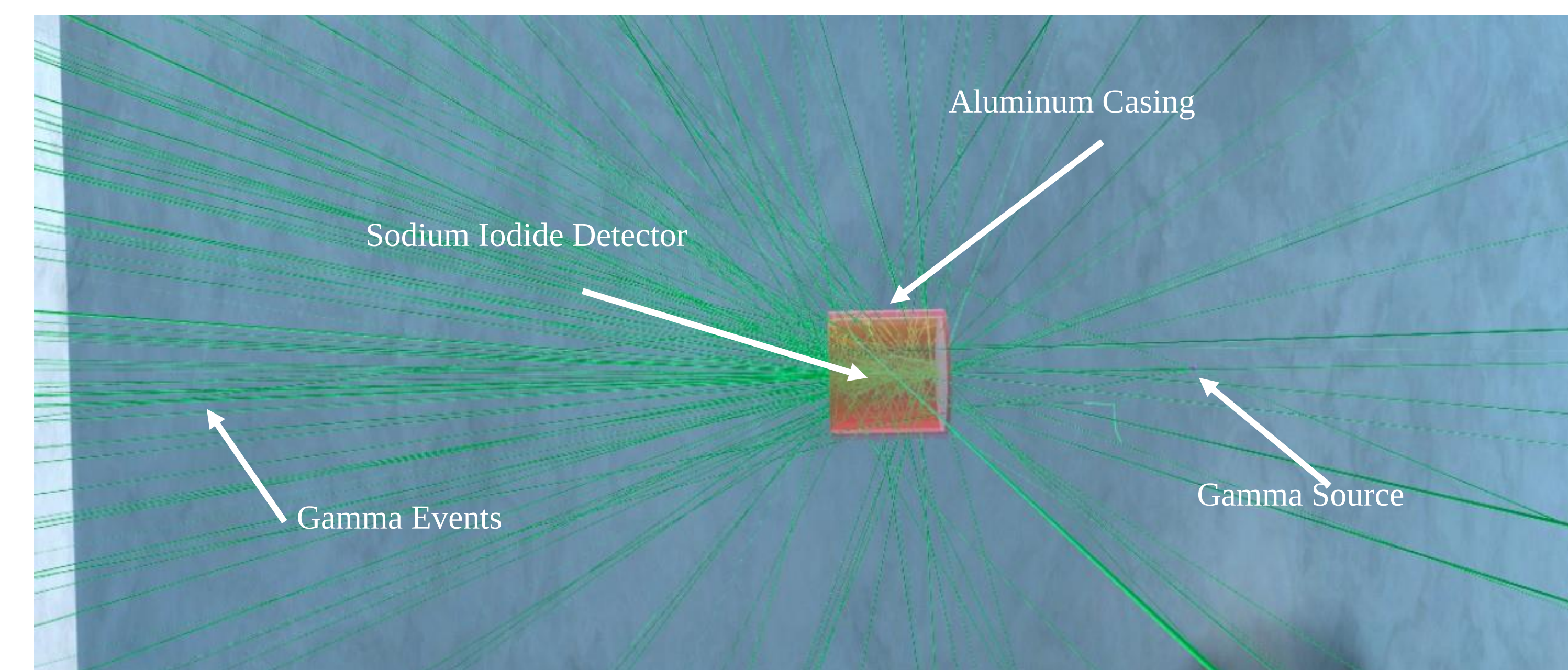
Events Color



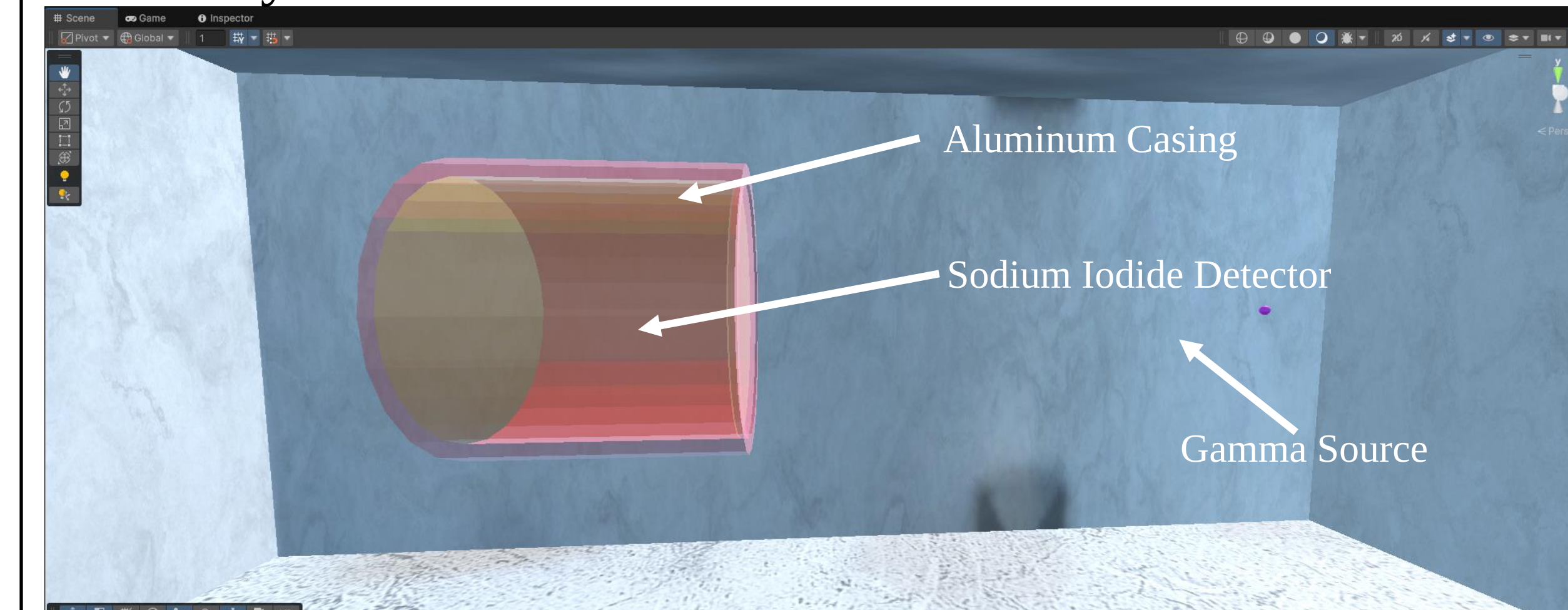
Event Animation



After Animation

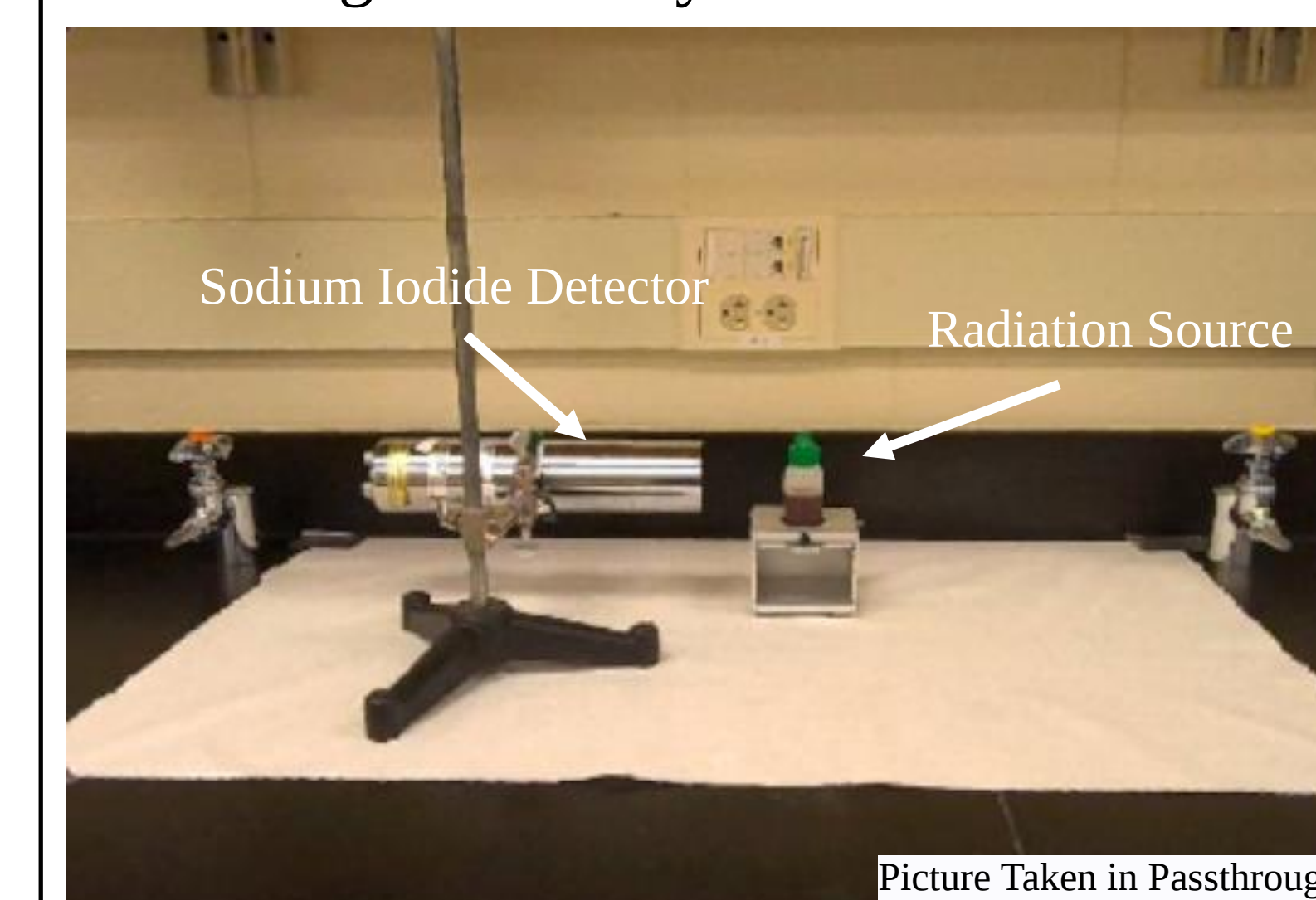


Geometry

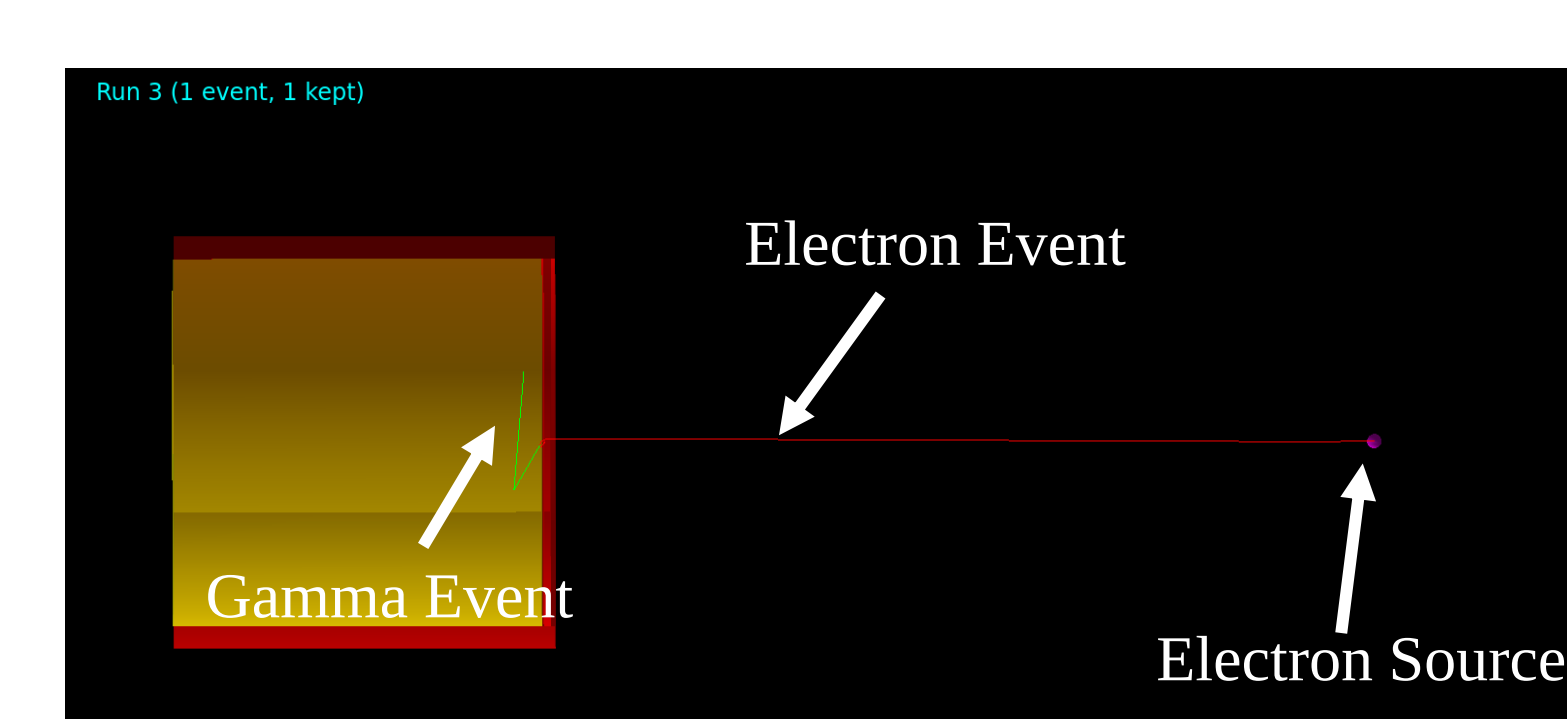


Next Steps

Passthrough Geometry



Color Coded Interactions



CSV Usage

EventID	TrackID	InitialPart	FinalPart	StartX	StartY	StartZ	EndX	EndY	EndZ	DirX	DirY	DirZ	Height
2	1	gamma	gamma	0.326917	0.159203	107.557	-2.20049	-2.10039	105.252	-0.61644	-0.55112	-0.56238	4.10001
2	10	e-	e-	-2.20049	-2.10039	105.252	-2.20049	-2.10039	105.252	0.851446	-0.39275	0.347546	7.99E-08

Separate out based on particle type.

References

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Acknowledgements

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